TECHNICAL REPORT: LISTER-JAGUAR, p.32

# SPORTS CARS ILLUSTRATED

35¢ july 1958



550 HORSES ON THE ROAD:

## THE MEN AND CARS OF AUTO UNION

# INTRODUCING

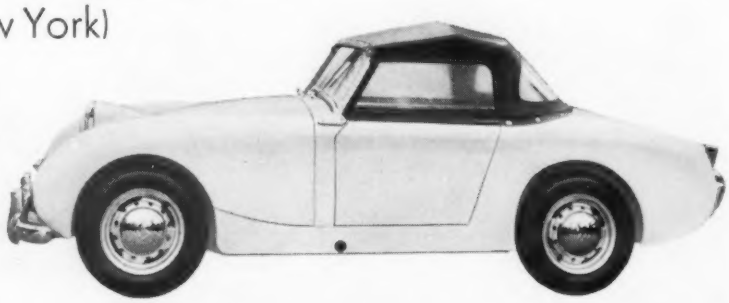
an entirely **new** sports car!

Austin-Healey

# 'SPRITE'

This sassy little brother to the
Austin Healey 100-Six sets a new high
in 948 c.c. performance...a new low in cost!
($1,795. p.o.e. New York)

*Ask your dealer for details on the new Austin Healey 'Sprite' today!*



*Represented in the United States by*

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# MG MITTEN MIDSUMMER CLEARANCE

## save on everything from a to z . . . we pay postage!*

### A

ASH TRAY COMBINATION for MGA, Porsche and others, includes automatic lighter, deep ash-tray. Black leatherette finish. 6 or 12 volt. $8.95

ASSIST GRIP for MGs and others. Sturdy, extra heavy chrome plated, aesthetically shaped. $3.50

### B

BELTS—SAFETY, IMPACT for all cars and drivers. Equal or exceed CAA specs. Sleek nylon, chromed buckle. Black, red, gray, green, blue, tan, white. With "U" bolts.....$10.95 ea.

Same, but with "Eye-bolt".....$12.95 ea.

BELTS—SAFETY, NOVITAS with metal-to-metal buckle . . . same color choice as above. $10.95 ea.

### C

CARPETS, REPLACEMENT for MG TC TD TF & A, HEALEY, JAG, T BIRD, CORVETTE. Ready to snap or tack in place, no cutting. All sections bound. Specify *wool* or *nylon*. Brown, black, tan, red, maroon, blue, green. One price. $28.50

CAR COATS, LADIES, machine washable. Sailcloth, lined in quilticel, detachable hood. Sizes: S(10-12), M(14-16) L(18-20). *Blue* with beige lining, *Beige* with red lining, *Gray* with red lining. .....$14.95

CALYPSO HAT for summer has cotton crown and tie, Italian straw brim (natural color). Black, white, red, blue, yellow crown.....$3.95

### D

DRAGER TIRE GAGE is preferred by those who take their cars seriously. Reads in psi & atmospheres, adjustable zero, extremely accurate. $6.95

### F

FIRE EXTINGUISHER is tiny enough to fit in hand, big enough to afford real protection. Includes mounting clip.....$7.95

Refills .....$1.25 ea.

### G

GEAR SHIFT KNOBS for most sports and imported cars (give make, yr. model) bright silicone finished, comfortable, fit the hand. Two sizes (please specify) 1½" dia., 1⅞" dia. $2.25

KNOB WITH MG INSIGNIA.....$1.95

GEARSHIFT LEVER EXTENSION for Morris, VW, Renault, Porsche, 4" long, 40° bend.....$1.35

### H

HOLDER-SPARKLUG keeps spare set of plugs ready for use and gapped. For 4 plugs...$2.95 For 6 plugs...$3.50

### K

KANGOL CAPS styled strictly for sports car drivers are tailored in butcher linen. Blue or white. Give head size.....$3.50

### L

LUGGAGE RACKS for MGA, HEALEY, TR, JAG, T BIRD & CORVETTE make these cars practical for travel. Heavy chrome plated steel tube frame, polished hardwood, good looking, practical. No holes, attaches in seconds, removes same way. Specify make, yr. of car.....$24.75 (add $2.00 postage)

### M

MGA FLAP STAY holds curtain flap up for ventilation and signalling.....$3.95

MGA GRILLE GUARD saves $75.00 grille. Regularly $22.95, Summer Sale price.....$19.95 (add $1.00 postage)

MG MITTEN CATALOG with lots more bargains . . . FREE!

MIRRORS, DESMO, BOOMERANG swing back into original setting no matter how often or hard they're bumped.....$4.95 ea.

### N

NOBODY can resist the "Little Wheel" as a desk ornament. Wire spokes, knock-off hub and real rubber tire.....$2.50

### O

OH, we almost forgot GLOVES.

GRAND PRIX GLOVES, the usual description, only we've been getting even better reports from drivers who race. These gloves are *lucky*, too! . . . natural cape color (tan) . . . $7.95 pr. Black . . . $8.95 pr. (Men's sizes: 7½-10, Gals: 6½-7½)

LESTON GLOVES with knit mesh back, leather palms and tips. Sizes: 7-10.....$6.50

### P

PEDAL PADS for MG . . . $1.00 pr. HEALEY, JAG .....$1.25 pr.

PLASTIC OIL DRIP PAN saves your garage floor from spots and you from your wife's wrath. $4.95

PROTECTION FOR PARKED CAR is offered by SONIC SHIELD which honks your car's horn whenever some idiot starts to bang into it. Two wires to connect, foolproof.....$9.95

### R

RACING GOGGLES, famous Aintree model, made in England with soft leather padding, adjustable bridge, wide angle vision. Guaranteed shatter-proof and covered by insurance policy. $6.95 pr.

REPLACEMENT SMOKED LENSES.....$1.95 ea.

RUMP ROOST saves your feet at the races. Supports 225 lbs., stands 14" high, has 12½" by 6½" seat and folds flat to less than 1" thick package. .....$1.95

### S

SILK SCARVES 32" square make keen head coverings or table decorations. Racing flag motif with description of each. Basic colors: Beige, gray, light green, blue, red.....$2.95

STRAW SAILORS for gals are the smartest. Natural Italian straw brim and flat crown, ties in: Black, white, red, yellow, blue.....$4.95

SPORT REST is a small, comfortable reclining chair with aluminum frame and canvas cover . . . weighing only 5 oz! Colors: Red, biege, green, blue .....$5.95

### T

TONNEAU COVERS of finest 3-ply material for most sports cars cost only $29.95 at MG MITTEN . . . MGA (special).....$18.95 Write for *free catalog* for details.

TOPS which you can install yourself, full instructions and all hardware included are on the same wonderful money-saving deal. $29.95 (Mfgr's list: $48.50) for like MG, JAG, HILLMAN, PORSCHE, MERCEDES, etc. Catalog tells all.

TACHOMETER, completely self-contained, two wires to connect (to distributor and ground), all mounting hardware.....$28.95

TOP HOIST for all hardtops, stores top in garage $9.95

TOW ROPE for emergencies.....$7.95

### V

VISORS for MG, TC, TD, TF & A and TR are heavy tinted acrylic, attach without drilling. $5.95 ea.

MGA COUPE VISOR .....$8.95 ea.

### W

WINDWINGS, complete, ready to install with tools provided, no holes, no interference. MG, TC, TD, TF & A.....$15.95

TRIUMPH WINDWINGS .....$16.95

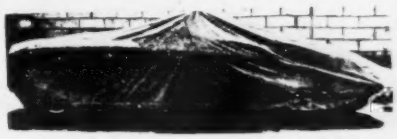
AUSTIN HEALEY & MERCEDES WINGS ....$17.95

ADVANCE COPIES

Nothing begins with an X so how about ordering a Key Fob for your car? Only $1.50 and it will make your faithful auto so happy to be personalized. Most any marque in stock, so order in confidence.....$1.50

### Z

The famous MITTEN is traditionally last in our ads because we want to remind you how important it is to always keep your car in good shape . . . it means many more dollars, even hundreds, at trade-in time. Cover it with a tailored MITTEN for sure protection.



MG Mitten, Healey Hugger, Triumph Tunic, Alfa Apron (Spyder) — $17.95 Lightweight Canvas, $24.50 Duralin (Water repellent mat plastic)

Jaguar Jacket (XK 120), Porsche Parka, VW Vest, Ghia Gown — $22.95 Canvas, $29.50 Duralin

Jaguar Jacket (140-150), Mercedes Muff (L90-300SL), Corvette Cap, Thunderbird Tepee — $27.95 Canvas, $32.50 Duralin

**ORDERING INSTRUCTIONS:** Mark items desired with pen, give make, year, model of car, size, color where needed, name, address and money, tear out page and mail. We handle all other details. Calif. people add 4%.

*Postage paid on everything except as noted.

**HANDY ORDER BLANK**

**Send me goodies indicated: I enclose loot.**

Name .....

Address .....

.....

Car ..... yr. .....

## MG MITTEN BOX 157
## Dept. S7

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**(2 blks. S. San Bernardino Freeway)**
**CUmberland 3-1410**

# SPORTS CARS ILLUSTRATED

july 1958
no. 1 vol. 4


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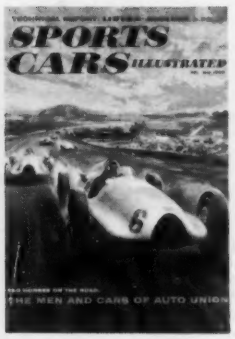


550 horses powering 2500 lbs, on the road, of Turnabout Tornado, gave Auto Union the highest power/weight rating in racing history. Painting by Fred Kirberger.

## road tests



## features



## technical



## competition



## departments






SPORTS CARS ILLUSTRATED is published monthly by the Ziff-Davis Publishing Company, William B. Ziff, Chairman of the Board (1946-1953), at 434 South Wabash Ave., Chicago 5, Ill. Entered as second class matter at Post Office, Chicago, Illinois, under the Act of March 3, 1879. Authorized by Post Office Department, Ottawa, Canada, as second class matter.
SUBSCRIPTION RATES: One year, U.S. and Possessions and Canada $4.00; Pan American Union Countries $4.50; all other foreign countries $5.00.
SUBSCRIPTION SERVICE: All correspondence concerning subscriptions should be addressed to Circulation Dept. 434 South Wabash Ave., Chicago 5, Ill. Please allow at least four weeks for change of address. Include your old address as well as new – enclosing if possible an address label from a recent issue of this magazine.
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# WHAT'S AS EFFORTLESS AS A CORVETTE ?

by Chevrolet

Soundlessly soaring, buoyed on the invisible rivers of the upper air, a sailplane moves with a serenity that has its road-borne counterpart in the arrowing flight of a Corvette.

Is it strange that this authentic sports car, bred for fiery competence, should cruise so effortlessly? Not really; not when you wed a silken cyclone of a V8 to a beautifully compact body and a chassis that clings to the road like a stalking panther. That's when you get acceleration as easy as a giant's stride, a liquid grace in motion, steering as sharp and precise as a scalpel.

In plain truth, a Corvette travels in a way no other American car can equal. You can test this—and assure yourself an hour of unique pleasure—simply by calling your Chevrolet dealer. He will be glad to let Corvette speak for itself!

. . . Chevrolet Division of General Motors, Detroit 2, Michigan.

# very sincerely yours:

WELL, IT HAD TO HAPPEN and happen it did. Last month we pointed out that if the Sports Car Club of America continued to ignore the movement toward some sort of limited professionalism in sports car racing somebody would step into the picture with an all-out program. It was also predicted that the more strapped competition members would be attracted to an organization that offered at least tax relief and some form of recompense to defray the costs of racing.

Not five days after the magazine appeared on the news-stands came the announcement that the senior professional racing organization in the country—United States Automobile Club—was forming a separate road racing division on a strictly professional basis. Further, they were doing so with the blessings and backing of four of the major permanent road circuits: Lime Rock Park, Virginia International Raceway, Marlboro and Riverside.

Notably, they are setting up the division in an absolutely clean manner, Duane Carter was emphatic in pointing out that USAC is not out after anybody's scalp. They will give sanction to any reliable promotor with a *road course* who meets their requirements. Their races are open to anyone who can pass their licensing requirements for road (not track) racing be he professional or amateur. They are having nothing to do with such things as production MG or Alfa races and the like; these are, to USAC's way of thinking, strictly for club races and not their particular dish of tea. Rather, they are, for the first season at least, eschewing class racing and concentrating on the big-bore modified equipment. If anything this last indicates their desire not to step on any club's toes.

All of this could be a move for good—it could also hurt. If the amateur clubs just ignore USAC and USAC's events or try to fight them by scheduling events at the same time great harm could result in the form of splinter groups all squabbling over a strictly limited piece of pie. If, however the SCCA recognizes that professionalism is here to stay and forms their own professional or open division a very strong, healthy sport can be developed and at the same time the Club would not lose membership to what is, after all, not a club but a pure racing business organization.

We are not advocating here that SCCA set up professional races or promote such events. What we are suggesting here is that SCCA open some of its races—presumably National events—to those who have "gone pro" and who are members of SCCA or are invited by the Club to participate. They need not pay a penny in prize money, keeping their own races strictly amateur. What could be done is to set up professional memberships and those who become such would be allowed to enter open races only as far as the Club is concerned. In this way the professional member could compete both here and abroad as a known professional and yet not lose his Club status.

Those professional members who enter open SCCA events would then be free to accept whatever help they could get from industry and also be free to enter those USAC races which did not interfere with SCCA events. Further, and even more imporant, participation in foreign events, virtually all of which are money races, would carry no club stigma. The one stipulation to all of this would be that the member involved declare openly his professional status for all to know. Such a declaration would carry with it the agreement to leave Regional and closed events to the amateur members. In this way the club can retain its amateur character and at the same time impose no penalty on those of its members who have proven themselves to be of such caliber that they can compete on a professional level.

This or a similar plan must come. Further it must come from the amateur clubs such as the SCCA and CSCC. Failing to face the facts of racing life today can mean the serious weakening of the clubs and the sport itself. A compromise such as outlined above could make American road racing the envy of the world.

In fact we'll stick out our neck and predict that such a set-up could prove the greatest source of top-notch race drivers the world has ever seen. Want to become Champion of the World? O.K., join the club and prove to the folks that you're good enough to try.

*—john christy*

## OH YEA!


*"I SAID TO MYSELF . . . 'HENRY YOU OLE DOG YOU SHOULD HAVE MORE CONSIDERATION FOR HELEN, POOR LITTLE WOMEN STUCK IN THE HOUSE ALL DAY . . . OUGHTA HAVE SUMPTIN' SHE CAN TAKE FOR A SPIN WHILE YOU'RE AT THE OFFICE.'"*

*"WE'VE HAD THIS T-BIRD THREE MONTHS COME THIS FRIDAY, AND YOU KNOW THIS IS THE FIRST TIME HENRY HAS ALLOWED ME EVEN TO SIT IN IT."*

# Sounds of SEBRING 1958


RLP 5011 • $5.95

Once again Riverside brings you the exciting on-the-spot coverage of America's greatest race. This year we drove our specially equipped mobile recording unit (a converted Greyhound bus) to Sebring, wired all the pits, set up two-way radio communication and recorded for twelve hours everything of interest as Phil Hill and Peter Collins led the Ferrari team to victory. Hear the actual words of David Murray as the Ecurie Ecosse team disintegrates, of Reg Parnell after Aston-Martin blows its gearboxes, the words before, during and after the race of the top drivers planning and executing their strategy. And best of all, hear dramatic coverage of the winning car and drivers (Hill and Collins) as hour by hour they relentlessly push on to a magnificent brakeless victory. Once again in superb high fidelity; this is racing's only living inside story.


RLP 5001 $5.95

**SOUNDS OF SEBRING '56**

The full report of the race. Interviews with the world's best drivers, including the American champions. Sounds of the cars warming up, the fabulous Le Mans start, and the race itself.


RLP 5002 $5.95

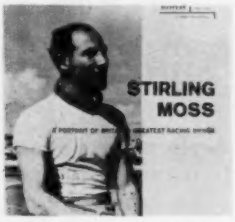
**SPORTS CARS IN HI-FI**

A solid hour of the sounds of the world's great competition cars—Jaguars, MG's, Porsches, Maseratis, Ferraris, Lotus' and many others—at rest and at speed in spectacular Hi-Fi.


RLP 5003 $5.95

**PIT STOP**

In the pits at Nassau, pit activity, conversations and interviews, emergencies and high emotion; technical inspection, the drivers meeting, Le Mans start, discussions with Moss, Portago, Shelby, Hill, others. Fabulous sounds as usual.




RLP 5004 $5.95

**STIRLING MOSS**

A portrait of one of the world's greatest drivers. Moss discusses a season with Mercedes-Benz, driving techniques in detail, his ratings of the top drivers and his philosophy of the sport.


RLP 5005 $5.95

**PHIL HILL**

An intimate portrait of America's finest driver. In his inimitable way, Hill brings you graphic pictures of sports car racing the world over, and tells the inside story of his own rise to fame.


RLP 5006 $5.95

**CARROLL SHELBY**

Shelby, the U. S. champion, explores the American racing scene, compares it to Europe, analyses his own driving technique and comes up with a few surprises when he rates the world's best drivers.


RLP 5007 $5.95

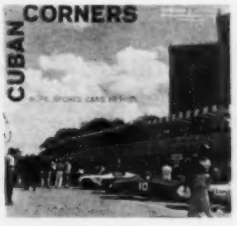
**MARQUIS de PORTAGO**

A memorial tribute to one of the most spectacular and naturally talented drivers who ever lived. In his own words, as well as those of Fangio, Collins and others, this is an inside picture of Fon's meteoric rise in motor racing.


RLP 5008-9
(2 Records) $11.90

**SOUNDS OF SEBRING '57**

The most spectacular sports car recording ever produced. Absolutely a complete coverage of the 1957 race, from practice to last lap. Fantastic sounds, eaves-dropped pit stops, interviews with all the great competitors, and an hourly account of the race.




RLP 5010 $5.95

**CUBAN CORNERS**

Another great recording of sports cars in action. Four great corners in Cuba's fabulous round-the-houses Grand Prix. Loaded with exciting local color as well as glorious engine sounds.

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**RIVERSIDE RECORDS**

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Please rush the records checked. ☐ 5001 ☐ 5002 ☐ 5003 ☐ 5004 ☐ 5005 ☐ 5006 ☐ 5007 ☐ 5010 ☐ 5011 at $5.95 each. ☐ 5008/9 at $11.90

Send the records postpaid.

NAME_____

ADDRESS_____

# letters

### FURY FUROR

I have just read the March issue of SCI. In this issue you receive considerable criticism in the letters department, and you mentioned being accused of accepting bribery in the Fury report. I am on your side — report your opinions and allow the reader to make up his own mind; he is not a captive who must believe everything you say. I do not feel, however, that criticism is harmful; it is even more healthy than praise. You would not be doing your job completely if you were not challenged. . . .

Thomas G. Terbell, Jr.
Atherton, Calif.

*That's what makes horse races, boat races, sports car races, and life interesting. —Ed.*

### WHILE THEY LAST . . .

In your road test of the Ferrari 250 GT, a price of $10,975 was printed. This should have been $12,450. As far as I know, the error is no one's fault, but we would appreciate a mention in the next issue of SCI stating the correct figure. . . . Folks . . . come in for a ten-thousand dollar Ferrari and we have to tell 'em it's twelve. Thanks so much.

Ray Lavely
Ferrari Representatives of Calif.

*Such are the sorrows of life.—Ed.*

### YES

Blaming our road accidents on speed seems to be a cover-up blanket reason which keeps us from analyzing and emphasizing the true causes. Certainly, as a nation of individuals, we would be safer if we stayed in bed. On the other hand, if we are to be an alert moving group of people, it is natural that as drivers, roads and machines improve we will travel faster and faster. To blame our accidents on our rate of travel does not help us to learn how to do this more safely.

J. F. Mahony
Brielle, N. J.

### COBB DETHRONED

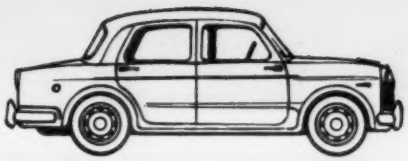
According to your calculations in the new T Bird road test, the new bird is capable of and I quote: "MPH per 100 rpm = 25.2". With an engine that develops its peak H.P. at 4600 rpm, this would indicate a top gear speed of 1,159.2 mph at top revs. Come now gentlemen! . . .

J. Clayton Henrikson
Minneapolis, Minn.

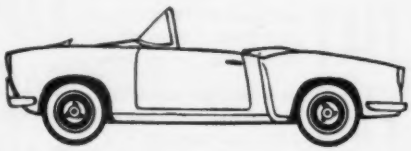
*The figure was supposed to be mph per 1000 rpm. The typesetter has been banished to River Rouge for six months for the goof. —Ed.*

### WINNER ANNOUNCED

*The winner of the electric race-car speedway awarded by SPORTS CARS ILLUSTRATED at the New York International Automobile Show was Peter Prudente, 21 Rockwood Avenue, Port Washington, Long Island, New York.*



# FIAT'S THE CAR THAT CAPTURED AMERICA



No *other* car (domestic *or* imported) ever came so far so fast as Fiat in America. First sold here just last summer, the new Italian-made Fiat is already challenging the leaders in imported car registration. The reasons are easy to see: no other car combines the Italian flair for modern design with the Italian tradition of fine craftsmanship—*plus* the double economy of incredibly high mileage (yes, up to 53 miles a gallon) and low, low cost. No other quite so nimble, quite so much at home on hills and highways, on city street or far-ranging freeways. Now come test-drive this remarkable car, expecting far more in performance and quality than any car in its class.

**NO SERVICE WORRIES**—When you own a Fiat you are assured of top service at all times. First—Fiat Factory specialists have been brought to America to see that you get that service. Second—Regular service schools constantly train dealer servicemen. Third—There are plenty of spare parts available at a moment's notice.

N. Y. Port of Entry Suggested Retail Prices

| | | |
|---|---|---|
| 500 | Convertible | $1098* |
| 600 | Sedan | 1353 |
| 600 | Convertible | 1415 |
| 600 | Multipla (5 or 6 Seater) | 1658 |
| 1100 | Sedan | 1743 |
| 1100 | Familiare Station Wagon | 2129 |
| 1200 | Sedan | 2278** |
| 1200 | Sportsman Roadster | 2553 |

(Fully equipped with heater, windshield washer, leatherette upholstery, white wall tires, directional signals, undercoating, emergency tool kit and reinforced bumpers. No extras.)

*Windshield washer and white wall tires not available on this model.

**With town car cloth upholstery only.

SLIGHTLY HIGHER ON WEST COAST

# FIAT

*Distributor for Northeastern States and California*

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WILSON MOTORS
820 E. Sante Fe

FIAT IN PHOENIX
EUROPEAN MOTORS, LTD.
1329 N. Central Avenue

FIAT IN YUMA
GRIFFEN BUICK INC.
IMPORTED CAR DIVISION
1001 4th Street

## NORTHERN CALIFORNIA

FIAT IN BELMONT
HOWARD AUTO COMPANY
1538 El Camino Real

FIAT IN CHICO
MILLER & GIBERSON IMPORTS
2303 99 E. North

FIAT IN CONCORD
DOUG DICKER, INC.
2346 Monument Blvd.

FIAT IN EUREKA
K. B. McCARTHY IMP. CAR DIV.
4th at "A" Street

FIAT IN FRESNO
LIRA MOTORS
1461 Broadway

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FIAT IN LOS GATOS
EL GATO EDSEL SALES
291 E. Main Street

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TED SCHUMAN
19th and "L" Sts.

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KUNSTLE MOTOR CO.
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3737 Broadway

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4195 El Camino

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FIAT IN SAN FRANCISCO
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FIAT IN SAN JOSE
FLETCHER MOTOR CO.
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SUBURBAN MOTORS
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KELLER-REEVES MOTORS
216 N. El Dorado Avenue

FIAT IN WATSONVILLE
TOM LAWSON
216 Van Ness Avenue

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PEAIRS BROS. IMPORTS
15734 S. Bellflower Blvd.

FIAT IN BURBANK
ITALIANO MOTORS
317 N. Victory Blvd.

FIAT IN COVINA
C. VERNON
202 W. Badillo St.

FIAT IN EL CAJON
VALLEY IMPORT
123 N. Sunshine St.

FIAT IN ENCINO
ENCINO CAR CENTER
17233 Ventura Blvd.

FIAT IN ESCONDIDO
EUROPA AUTO IMPORTS
311 E. Ohio St.

FIAT IN VAN NUYS
C. HARRY DOW
7711 Van Nuys Blvd.

FIAT IN FULLERTON
RENFREE MOTORS
748 W. Commonwealth

FIAT IN GLENDALE
COLONIAL IMPORTS
136 S. Glendale Avenue

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HERMOSA IMPORTS & FIAT DIV.
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1540 S. Figueroa St.

FIAT IN EAST LOS ANGELES
ANTOYAN PONTIAC IMP. CAR DIV.
5059 Whittier Blvd.

FIAT IN MONROVIA
LEES EDSEL INC.
139 W. Huntington Dr.

FIAT IN ONTARIO
VEY-SETT AUTOMOBILE CO.
611 W. Holt Blvd.

FIAT IN PASADENA
MONISE MOTORS INC.
90 N. Santa Anita

FIAT IN PASADENA
WILLARD KARL MOTORS, INC.
316 W. Colorado St.

FIAT IN POMONA
W. R. SHADOFF INC.
4th at Locust

FIAT IN REDLANDS
GARVEY MOTORS
415 Orange Street

FIAT IN SAN DIEGO
EUROPEAN MOTOR SALES CO.
OF SAN DIEGO
17th & Broadway

FIAT IN SAN GABRIEL
LAS TUNAS MOTORS
433 W. Las Tunas Drive

FIAT IN SAN LUIS OBISPO
STANDARD MOTOR & EQUIP'T CO.
1701 Monterey St.

FIAT IN SAN PEDRO
CECIL L. THOMAS & SONS
339 S. Pacific Ave.

FIAT IN SANTA ANA
HARRISON RENO
201 N. Sycamore

FIAT IN SANTA MONICA
BILL HUNT MOTORS
10th & Wilshire Blvd.

FIAT IN VENTURA
HARRIS MOTOR CO.
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IMPORTED SPORT CARS
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TOLM MOTORS, INC.
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MORLEE MOTORS, INC.
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CONTINENTAL AUTO LTD.
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ITALIA MOTOR CO.
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R. E. CLARK CO., INC.
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**FIAT IN FALL RIVER**
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Div. of Everett Motors, Inc.
874 South Main Street

**FIAT IN FALMOUTH**
SAVERY CHEVROLET, INC.
662 Main Street

**FIAT IN GREENFIELD**
HARTWIN DODGE, INC.
397 Federal Street

**FIAT IN NEEDHAM**
MUZI FOREIGN CARS, INC.
555 Highland Avenue

**FIAT IN QUINCY**
PRESIDENT CHEVROLET, INC.
540 Southern Artery

**FIAT IN WILMINGTON**
FRED F. CAIN, INC.
580 Main Street

**FIAT IN WORCESTER**
L. F. HARRIS, INC.
248 Park Ave.

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**FIAT IN CLAREMONT**
S & O GARAGE, INC.
181 Washington Street

**FIAT IN MANCHESTER**
MERRIMACK ST. GARAGE, INC.
40-56 Merrimack Street

**FIAT IN PORTSMOUTH**
ZOFFOLI MOTORS, INC.
Interstate Highway

## NEW JERSEY

**FIAT IN ATLANTIC CITY**
CARLAN MOTORS, INC.
42 N. Albany Ave.

**FIAT IN CLIFTON**
DE TONE FOREIGN CARS, INC.
540 Lexington Avenue

**FIAT IN EAST ORANGE**
ALPINE CARS, INC.
235 McKinley Ave.

**FIAT IN EAST PATERSON**
STEIKER INDUSTRIES
10-12 Broadway

**FIAT IN EATONTOWN**
THE BUFF-HAUGER MOTOR CO.
Route 35

**FIAT IN ENGLEWOOD**
STILLMAN AND HOAG, INC.
85 Van Nostrand Ave.

**FIAT IN MONTCLAIR**
IMPORTED MOTOR CAR CO., INC.
636 Bloomfield Avenue

**FIAT IN MORRISTOWN**
CIS-ALPS MOTOR CAR CO., INC.
35 Market Street

**FIAT IN NEWARK**
DU KAY IMPORTED CARS
16 Elizabeth Avenue

**FIAT IN NEW BRUNSWICK**
DE ANGELIS BROTHERS, INC.
342 Handy Street

**FIAT IN PHILLIPSBURG**
VAN SYCKLE SALES
615 Memorial Parkway

**FIAT IN PLAINFIELD**
CREST BUICK, INC.
312 Park Avenue

**FIAT IN SOMERVILLE**
TOWN & COUNTRY IMPORTED CARS, INC.
21 Davenport Street

**FIAT IN UNION CITY**
GALLIAN BROTHERS MOTOR CO.
1701-07 Summit Avenue

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**FIAT IN BAYSHORE**
LAKE MOTORS, INC.
Sunrise Highway

**FIAT IN BROOKLYN**
AMERLING FOREIGN CARS, SALES & SERVICE, INC.
5401 18th Avenue

**FIAT IN BRONX**
CARRAZZA BUICK, INC.
2170 Jerome Avenue

**FIAT IN BUFFALO**
AUTO-LAND, INC.
1065 Main Street

**FIAT IN ENDICOTT**
CARROLL-KRESGE, INC.
3124 Main Street

**FIAT IN GLEN COVE**
LARRY GAVIN, INC.
130 Glen Street

**FIAT IN GLENS FALLS**
CARSWELL MOTORS, INC.
685 Glen Street

**FIAT IN GREAT NECK**
BIENER PONTIAC
250 Northern Blvd.

**FIAT IN HEMPSTEAD**
MONARCH EDSEL CO., INC.
281 Main Street

**FIAT IN HICKSVILLE**
H & G IMPORTED CARS, INC.
12 Jerusalem Avenue

**FIAT IN HUNTINGTON**
OXFORD MOTOR CAR CO., INC.
814 Jericho Turnpike

**FIAT IN MIDDLETOWN**
KROGSLUND MOTORS, INC.
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**FIAT IN MOUNT KISCO**
MILANO MOTORS CORP.
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**FIAT IN ROME**
PETTINELLI MOTORS, INC.
Martin Street

**FIAT IN ROSLYN**
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**FIAT IN SCARSDALE**
ROLLY MOTORS, INC.
Central Avenue at Ardsley Road

**FIAT IN SOUTHAMPTON**
THE IRVING GARAGE
9 Hill St. cor. Windmill Lane

**FIAT IN UTICA**
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240 East Pittsburgh Street

**FIAT IN MECHANICSBURG**
BEZILLA BUICK, INC.
East Trindle Road

**FIAT IN MEDIA**
COUNTY CARS, INC.
294 E. Baltimore Avenue

**FIAT IN PHILADELPHIA**
NORTHEAST IMPORTS, INC.
6242 Harbison Avenue

**FIAT IN PHILADELPHIA**
PLACHTER IMPORTED CARS, INC.
304 N. Broad Street

**FIAT IN PITTSBURGH**
INTERNAT'L AUTOMOBILES, INC.
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**FIAT IN WILKES-BARRE**
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WITH THE WORLD CHAMPIONSHIP

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# FREE-EXHAUST SYSTEMS




**AVAILABLE FOR THESE CARS:**

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| Fiat 600 Exhaust System | 19.95 |
| Fiat 1100 Exhaust System | 44.50 |
| Jaguar XK-140-M and 150 | 79.50 |
| MG-A Exhaust System | 29.50 |
| Mercedes 190-SL Exhaust System | 44.50 |
| Mercedes 220-S Exhaust System | 42.50 |
| Porsche Exhaust System, All Models | 44.50 |
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| Alfa Giulietta Sprint Exhaust System | 69.50 |
| Alfa Giulietta Spyder Exhaust System | 79.50 |
| Vespa Exhaust System | 19.95 |
| Lambretta Exhaust System | 19.95 |
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■ 1st and 2nd at Sebring in 1957—AND 1958! 1st, 2nd and 3rd in the Mille Miglia! World-championship cars rely on ABARTH FREE-EXHAUST SYSTEMS!

The same power increase and absolute reliability that brings in ABARTH winners is now available for *your* car! The proved-in-competition performance of ABARTH Systems in the world's most gruelling road races is a *confirmation* of the dynamometer tests that every ABARTH System receives before it is offered for sale.

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# TECHNOTES

Though the N. Y. International Auto Show is a thing of the past, all the leaflets and small boys having been swept up long ago, there were two technical innovations well worth describing. One is the widespread introduction of "Blend-it-yourself" Blue Sunoco gas, after a year of pilot testing in Florida. After setting a knob on the pump to one of six positions, the appropriate mixture of fuel from two tanks is pumped through a single nozzle into the customer's car.

One tank holds ordinary Blue Sunoco 200 and the other contains Sunoco Octane Concentrate. According to your dial setting, you get a blend of the two. The clue to how much of each is in the central digit of the number dialed (200, 210, . . . 240, and 260) . There being eight points to a gallon, it tells you how many are S. O. C., the rest being Blue Sunoco 200.

The company claims 94 octane (Research Method) for the 200 and 102½ for the 260. Simple proportioning indicates that swapping a pint of S.O.C. for one of 200 increases the octane rating 1¼ points and that the Concentrate itself must have a rating of about 104. So if you've got a friendly Sunoco dealer in your neighborhood, try pestering him for some straight Concentrate if you're having detonation trouble with a modified mill.

### HOBBS TRANSMISSION

Available for press trials was the B.S.A. Hobbs transmission in a 1½ liter Morris Oxford sedan. Made in six sizes, it is especially attractive for small cars because it has no power-wasting fluid flywheel. Four forward speeds are obtained from two planetary gear sets. Engagement and disengagement is through two clutches and three brakes, all automatically operated by a control system which is sensitive to car speed (driveshaft-driven oil pump) and to throttle opening. That oil pump has a bleed for clutch operation which enables push starts at 10-15 mph. No clutch pedal, of course, but a lever on the steering column (its quadrant is marked A, 3, 2, 1, N, R) provides a limit to the highest gear to be engaged. Downshifts so effected will not take place until the throttle is blipped hard, and then only if car speed has dropped enough. This downshift is done by a kickdown valve which raises the shift speeds at full throttle by some 120%. Small throttle opening shifts up (or down) are about 6, 15 and 24 mph, if memory serves us right.

A manual means of holding the kickdown valve open would be an improvement for keener drivers, giving automatic downshifts when slowing as revs drop.

While many readers may resent this further intrusion of automation into our field, we frankly liked it very much. Its adoption by any small car builder should open up a much wider market. But they shouldn't wait too long, for the next stop for the Oxford was Detroit, where several manufacturers were anxious to have a look at it. As we said, it looks good, and neither its weight nor its cost seem excessive.

*— Stephen Wilder*

# what's new?

### DIGITS FOR THE DASH

Just in case you always forget your horsepower, and it disturbs you to a point where you're willing to walk around to take a look at the fender to find out what it is, Johnson Accessory Co., 1790 Lakeshore Drive, Muskegon, Michigan, is marketing chrome-plated horsepower indicators that bolt to the fenders. If you don't like to get out of the car in close traffic, you can also attach one to your instrument panel. Price: $2.95 per pair.


### FIBERGLASS REPAIRS

Handiest product for the owner of a fiberglass-bodied car is this new Duro Epoxe Fiberglass Repair Kit featuring plastic glass and a new method of application. Exclusive features in the kit include Duro "Plastic Glass" which is used for making a special putty with the epoxe resin for use with almost any type surface, and 2 sheets of Pliofilm which enable the user to make a "prefabricated" patch without having to actually touch the resin. The kit is available in two sizes, listing at $2.25 and $5.95. For information write Monroe B. Scharff & Co., 10 Rockefeller Pl., New York 20, N. Y.

### LITER-SIZE OIL CHANGE

You know that bit about using 2 one-quart and part-of-a-third cans of oil every time you change the lube in your early Porsche, VW or Dauphine, but something has been done about it. White & Bagley, 100 Foster St., Worcester, Mass., is marketing OILZUM, a quality lube, in 2.5 liter cans. Nice, not to have to worry about that oil you've paid for and try to take home in an open can stuffed into the glove box to say nothing about oiled clutches. Ask for it at sports-car garages, or write to the company.

### ENGINE ANALYZER

This versatile automotive analyzer combines five individual pieces of quality testing equipment into a single, compact portable precision unit. Measuring 8" x 8½" x 5" and weighing less than eight pounds, the unique unit includes these testing instruments: 0–60 Degree Dwell Meter; 0–1000 rpm Low Range, 0–5000 rpm High Range Tachometer; 0–30 inch Vacuum Gauge; DC Ammeter; DC Voltmeter. The ASA-120 sells for $128.50 and further information can be had from Prokine-Petrovec Associates, 80 Middle Neck Rd., Roslyn, N. Y.

# COMING EVENTS

## *REGIONAL AND NATIONAL RACES*

| | |
|---|---|
| June 14, 15 | SCCA Laguna Seca, Monterey, Calif.<br>SCCA N. Y. Region, Lime Rock, Conn. |
| June 21, 22 | SCCA Elkhart Lake, Wisconsin |
| July 4, 5 | SCCA N. E. Region, Lime Rock, Conn. |
| June 28-29 | CSCC Riverside Raceway |
| July 19, 20 | SCCA N. Y. Region, Thompson, Conn. |
| Aug. 2, 3 | SCCA N. W. Region, Bremerton, Washington |
| Aug. 16, 17 | SCCA N. Y. Region, Montgomery, N. Y. |
| Aug. 30, 31 | SCCA N. Y. Region, Thompson, Conn.<br>CSCC Santa Barbara |

## *DRIVERS SCHOOLS*

(For further information contact Harold Annis Box 86, Chappaqua, N. Y.)

| | |
|---|---|
| June 21 | SCCA Area 1, Lime Rock, Conn. |
| Aug. 23 | SCCA Area 1, Thompson, Conn. |

## *INTERNATIONAL EVENTS*

| | |
|---|---|
| June 1 | Nürburg Ring 1000-km. sports car race |
| June 8 | Delamarre-Debouteville Grand Prix, France |
| June 9/14 | Rally of the Midnight Sun, Sweden |
| June 15 | European Grand Prix, Belgium |
| June 21/22 | Le Mans 24-hour race, France |
| June 22 | Imola Grand Prix, Italy |
| June 29 | Monza "500," Italy |
| July 4/12 | Alpine Rally, France |
| July 5 | Rheims 12-hour race, France |
| July 6 | French Grand Prix |
| July 19 | British Grand Prix, Silverstone |
| July 20 | Caen Grand Prix, France |
| July 27 | Bari Grand Prix, Italy |
| Aug. 3 | German Grand Prix |
| Aug. 10 | Swedish Grand Prix |
| Aug. 15 | Pescara Grand Prix, Italy |
| Aug. 17 | Portuguese Grand Prix |
| Aug. 17 | Sables d'Olonne Grand Prix, France |
| Aug. 27 | Liege-Rome-Liege |
| Aug. 30 | Brands Hatch race, England |
| Sept. 7 | Italian Grand Prix |
| Sept. 13 | RAC Tourist Trophy, England |
| Sept. 19/21 | Viking Rally, Norway |

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| | | |
|---|---|---|
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Sprint Spider, 1300 cc, 96 mph. Super Sprint Spider (VELOCE), 90 hp, 115 mph.

**TWO GIULIETTA SERIES COUPES:**
Sprint Coupe 1300 cc, 100 mph. Super Sprint Coupe (VELOCE), 90 hp, 115 mph.

*See your local dealer, or call*
*U. S. Distributor*

**HOFFMAN** **NEW YORK:** 443 Park Avenue, PLaza 9-5120 **BEVERLY HILLS,** California, 9130 Wilshire Blvd., CRestview 4-8231

# A.C. Aceca-Bristol


PATTERNED AFTER JOHN TOJEIRO's Bristol-engined special of several years ago, the Ace- and Aceca-Bristol indeed prove the hoary old maxim, "Racing improves the breed." Perhaps it might be rephrased to read "Breeding improves racing," for how's this for a competition record: In twenty-five starts, Bob Oker snagged twenty-five wins in Production sports car category on the West Coast, against such worthy opposition as Corvettes and 300SLs. At Sebring, four ACs started and four finished, with a class win against two liter Ferraris and Maseratis. At LeMans, the only AC entered finished tenth overall and first in the production category. In SCCA and CSCC racing, Bristol-engined ACs dominate Class E Production with only an occasional setback to remind us that driver skill counts for a lot, too.

This doesn't mean that AC is building race cars, though. Rather, it proves that they build pretty exceptional Grand Touring cars. We put the AC-engined Ace through its paces for SCI, August, '56. Its roadability was of an exceptionally high order and, with its single overhead camshaft, 90 bhp power unit, it was an exciting, exhilerating car to drive. Now Jackson-Moore had placed at our disposal an Aceca coupe with a Bristol B-type engine rated at 15 bhp more. But power to weight ratios for both cars were nearly identical, and we anticipated having little more to talk about than the coachwork of the coupe. This turned out to be far from the case.

The Aceca (pronounced Ay-see'-kuh) with the B engine is geared to run out of revs at just about the same top speed as the 90-bhp car. But there is a noticeable difference in acceleration, as the figures in the data table show. The Bristol engine, not noted for its silence, is surprisingly quiet to the Aceca's occupants due to good insulation of the passenger compartment . . . but at high revs the car's *gran turismo* personality gives way pretty completely to the character of a high-strung thoroughbred racing machine. As you accelerate with respectable torque and a speed-gathering pull, rather than a thrusting one, there is little change in sound level up to about 4000 rpm. Here the cam really slams in, the muscular torque with it, and a demonic howl crescendos until the 5000 rev red-line is reached. Such is the form of the B engine's torque curve that a zero to 80 mph run made with shift points at 4200 was a full three seconds slower than an identical run made with gear changes at 4900.

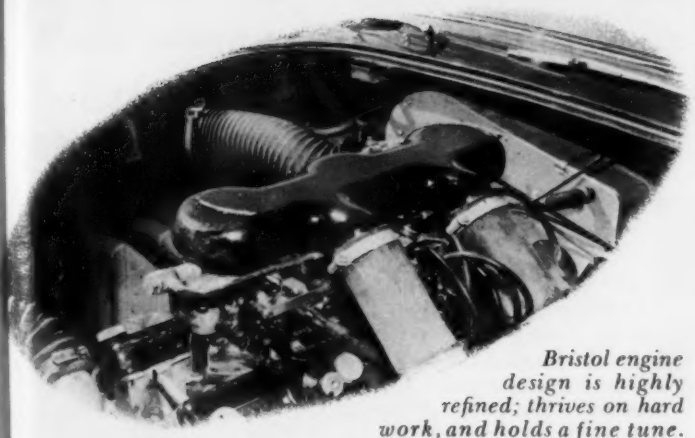
The B is the mild Bristol used by AC. Much hotter is the D, which is available in two stages of tune. The D2, which is the designation for the Stage One D, pulls about 126 bhp at 5750, as opposed to the B's 105 at about 4500. The D-cam comes in at about 3000 with a solid punch in the back, but it is weaker than the B below that figure. Only the D has acceleration pumps on the three Solex downdraft carbs. It also has individual flame-trap air cleaners, as opposed to the B's collector box and single, large air cleaner. The B's compression ratio is 8.5 to one; and here is the only difference between the D Stage One and Stage Two: They are 9.0 and 9.5 to one respectively. The D, of course, is the engine to race with. You can race, if you wish, with the "B," but you're giving away a lot.

The rumor mill in Britain has it that Bristol's new 2.2 liter engine soon will replace the current B type. Horsepower output will not be changed but much more low-speed torque will be on tap. The price of an Ace or Aceca with either B or D engine is the same, and if the 2.2 rumor is accurate, it will cost no more than the current alternates.

What do the various combinations cost? The Ace roadster is priced on the west coast at $4799 with AC engine or $5999 with the Bristol. The Aceca AC is $5699 and the Bristol-engined coupe is $6599.

The AC engine itself, although as venerable as the Offy in design, is just as classical and just as refined. Performance of AC cars with AC engines is entirely satisfying to many critical enthusiasts. Its fuel economy runs about four mpg higher than that of the Bristol and its durability is well established.

The much more costly Bristol engine also is far from new in concept, but the original design was a masterpiece and



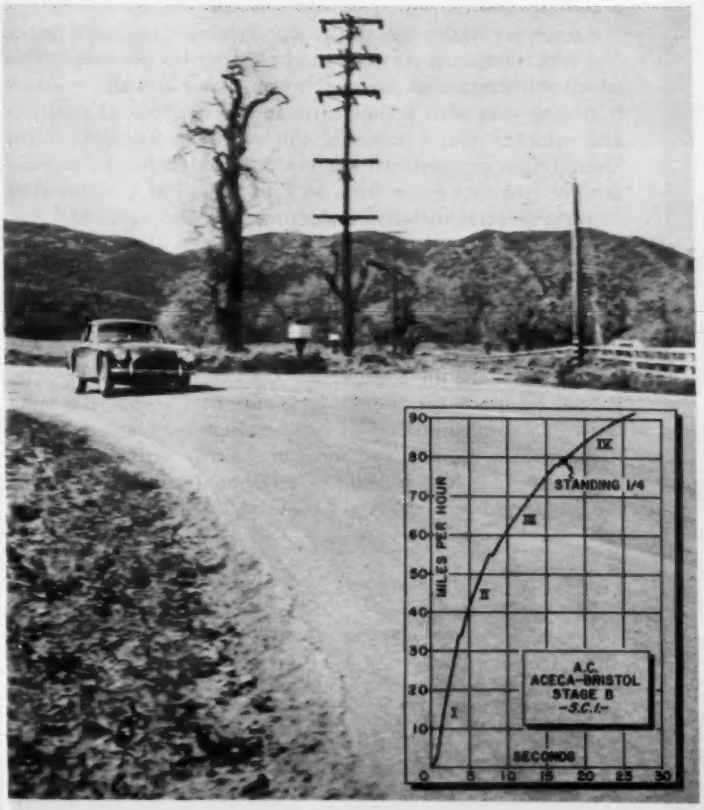
*Bristol engine design is highly refined; thrives on hard work, and holds a fine tune.*

the super-refined modern version is no less. It has the reputation of running for hundreds of thousands of miles and of *thriving* on hard work. A masochistic mechanism, it wants to be flogged (though not over-revved). It is polished and balanced throughout; its crank is nitride-hardened and runs in tri-metal bearings. It craves a sharp tune and holds it for a long time.

Roy Jackson-Moore confessed that the KLG plugs in our test car, which had logged over 21,000 miles, were the originals. "I don't sand blast them," he said. "That won't clean the remote air space. I take them apart and clean them with a brass-wire suede brush. Try it. You'll be amazed at how long they stand up to test."

Bob Oker told me, "The *only* trouble we ever did have with our Ace Bristol's engine was some piston ring flutter that beat the ring lands out." He then went on to explain that he habitually wound the engine at 7200 rpm!

*Race or road, ease of cornering makes for high average speed.*




## A. C. ACECA - BRISTOL

**U.S. Importer:** Rootes Motors, Inc.
505 Park Ave., New York, N. Y., and
9830 West Pico Blvd.
Los Angeles, Calif.

### PERFORMANCE

**TOP SPEED:**

| | |
|---|---|
| Two-way average | 105 mph |
| Fastest one-way run | 106 mph |

**ACCELERATION:**

| From zero to | seconds |
|---|---|
| 30 mph | 3.2 |
| 40 mph | 4.7 |
| 50 mph | 6.4 |
| 60 mph | 9.5 |
| 70 mph | 12.8 |
| 80 mph | 17.5 |
| 90 mph | 24.6 |
| 100 mph | 36.4 |
| Standing ¼ mile | 17.2 |
| Speed at end of quarter | 79 mph |

**SPEED RANGES IN GEARS:**

| | |
|---|---|
| I | 0-34 |
| II | 10-55 |
| III | 14-78 |
| IV | 16-top |

**SPEEDOMETER CORRECTION:**

| Indicated | Timed | Indicated | Timed |
|---|---|---|---|
| 30 | 31 | 70 | 69 |
| 40 | 41 | 80 | 79 |
| 50 | 51 | 90 | 89 |
| 60 | 60 | 100 | 95 |

**FUEL CONSUMPTION:**

| | |
|---|---|
| Hard driving | 19 mpg |
| Average driving (Under 60 mph) | 25 mpg |

**BRAKING EFFICIENCY:**
(10 successive emergency stops from 60 mph, just short of locking wheels)

| | | | |
|---|---|---|---|
| 1st stop | 70 | 6th | 75 |
| 2nd | 70 | 7th | 75 |
| 3rd | 70 | 8th | 79 |
| 4th | 70 | 9th | 79 |
| 5th | 70 | 10th | 83 |

### SPECIFICATIONS

**POWER UNIT:**

| | |
|---|---|
| Bristol stage B | In-line six, water-cooled |
| Valve Arrangement | Pushrod overhead, vee-inclined valves |
| Bore & Stroke | 2.59 x 3.78 in (66 x 96 mm) |
| Stroke/Bore Ratio | 1.45/1 |
| Displacement | 120 cu in (197/cc) |
| Compression Ratio | 8.5/1 |
| Carburetion by | Three Solex downdraft |
| Max. Power | 105 bhp @ 4750 rpm |
| Max. Torque | 122 lbs-ft @ 3750 rpm |
| Idle Speed | 650 rpm |

**DRIVE TRAIN:**

| Transmission ratios | test car | optional ratios |
|---|---|---|
| I | 2.29 | |
| II | 1.83 | |
| III | 1.29 | |
| IV | 1.00 | |
| Final drive ratio | 3.64 (3.89, others on order) | |
| Axle torque taken by | frame-mounted final drive housing | |

**CHASSIS:**

| | |
|---|---|
| Frame | Tubular Steel |
| Wheelbase | 90 in |
| Tread, front and rear | 50 in |
| Suspension, front and rear | Independent, transverse leaf spring and lower wishbones |
| Shock absorbers | Armstrong telescopic |
| Steering | Bishop cam type |
| Steering wheel turns L to L | 2 |
| Turning diam., curb to curb | R 36½ ft, L 33½ ft |
| Brakes | Alfin drums, 2 LS front, 1 LS rear (discs optional) |
| Brake lining area | 150 sq in |
| Tire size | 5.50 x 16 |

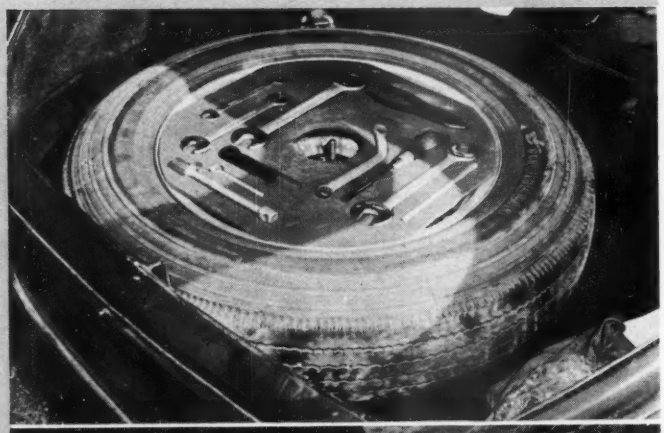
**GENERAL:**

| | |
|---|---|
| Length | 153 in |
| Width | 61 in |
| Height | 52 in |
| Weight, as tested | 2130 lbs |
| Weight distribution, F/R as tested | 44/56 |
| Fuel capacity | 15.6 U.S. Gallons |

**RATING FACTORS:**

| | |
|---|---|
| Specific Power Output | 0.88 bhp/cu in |
| Power to Weight Ratio | 20.3 lbs/hp |
| Piston speed @ 60 mph | 1740 ft/min |
| Braking Area | 143 sq in/ton |
| Speed @ 1000 rpm in top gear | 21.7 mph |

*ABOVE: Fully independent rear suspension allows driver to bore well into turn, as rear is tenacious even under power. BELOW: Road tools fit into recesses in spare tire leveler.*



*Front wheels are aligned with a slight positive camber; rear wheels with a slight negative camber, in the interests of directional straight-ahead stability. Body lines are clean.*

Oker also had this to say about the Bristol power unit. "The secret is in the tuning. There are few mechanics who can do a top job. The engine is so specialized that if it isn't right it isn't worth a darn for real output. I don't think it's a dual-purpose engine . . . not if you're interested in racing and being out in front. The Bristol holds a streets tune indefinitely, but to hold a really sharp racing tune I'd keep one off the streets. We found that ours would come in and start performing at optimum after about 45 minutes of racing. Then it would go better and better until about three races had been run. We learned, after that, to re-ring and re-tune."

Al Crundall of Santa Monica brought over one of the first Aceca Bristols to reach the U.S. That was in 1956 and he now has over 15,000 commuting miles on it. How has it performed. "Not a moment's trouble," he said. "It's a B type and I've had it indicating 120 often . . . must be about an honest 113. My gas mileage runs from 21 to 25 and I don't drive for economy."

From the moment we eased behind the Aceca's beautiful and fully adjustable steering wheel, we felt completely at home. The erect bucket seats seemed even more comfortable and to give better lateral support than those of the roadster. The full complement of instruments is laid out logically and is set off against panelling of walnut burl. The transmission tunnel is high, but leg and foot room, we felt, are more than sufficient. Visibility is excellent all around and is helped by the huge rear window (clear plastic). Many coupes tend to become mobile hothouses in warm weather, but not the Aceca. In addition to good insulation and the customary roll-down windows and no-draft vents the small rear windows may be opened. Too, the car's efficient heater includes a cool air source, with vent ducts to the foot area.

As you get under way in the Aceca, its steering has a heavy feel which becomes very, very light as speed is increased. The steering linkage is of the center-point type and the gearbox is Bishop cam with a slow ratio in the dead-ahead position and quicker ratios towards the extremes of lock. Most Detroit steering gearboxes follow this design but they don't achieve just two turns from lock to lock. The combination of variable ratio with quick steering gives the Aceca and Ace very distinctive steering feel. Oker reports that when he's been away from one of these cars for a while it still takes him a good 20 minutes to become accustomed to their steering again.

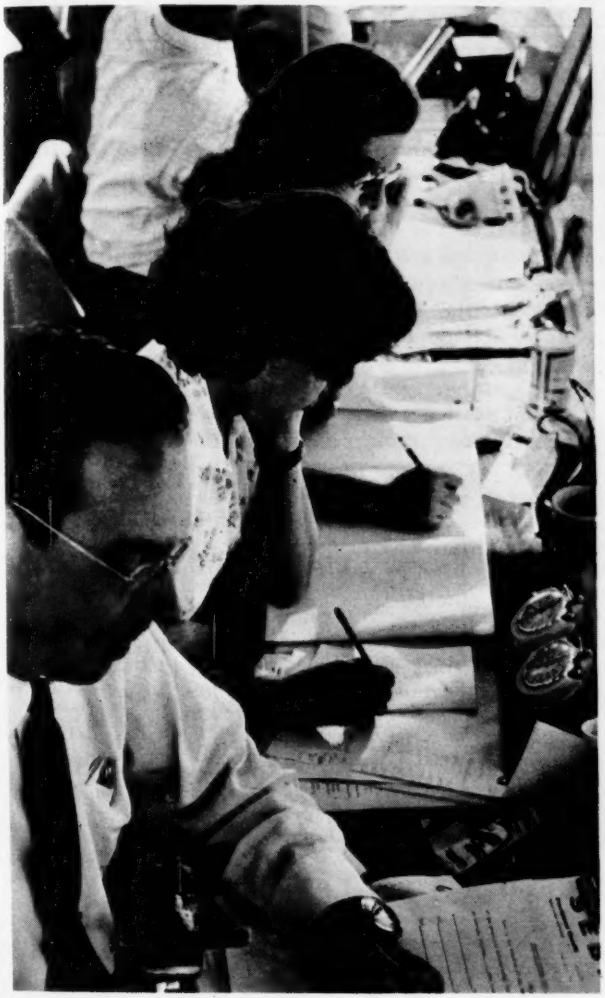
Transverse leaf springs above and light, steel-tube wishbones below are the basis of the car's suspension. The ride, judged by sports car standards, is very firm and at the same time very comfortable. The front wheels are aligned with a slight positive camber and those at the rear with slight negative camber, in the interest of straight-ahead stability. But the first time I took the Aceca past the 90 mph mark I backed

*(Continued on page 56)*

***Road racing can sometimes be confusing, but the thing that unravels it is . . .***

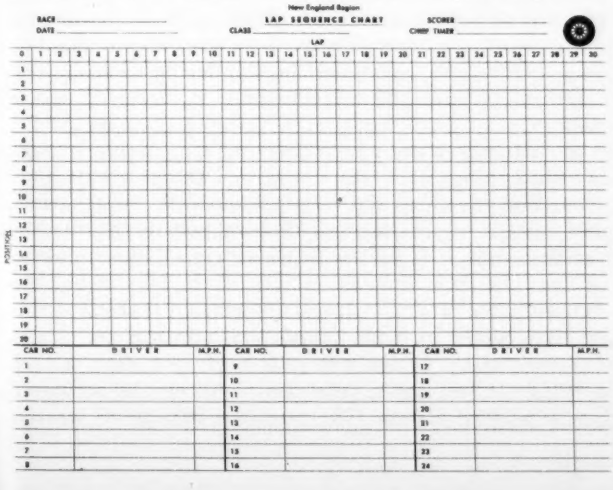
# LAP SCORING

## *Here's what it is and how to do it—*



*Sebring coverage for CBS. In the foreground, Art Peck, girl in middle is recording* all *cars regardless of position as check for author (at end) working on chart.*

*Although a ruled yellow legal pad will do, this is an SCCA chart. The numbers down the side indicate position and across the top are the laps. A scratch pad helps too.*



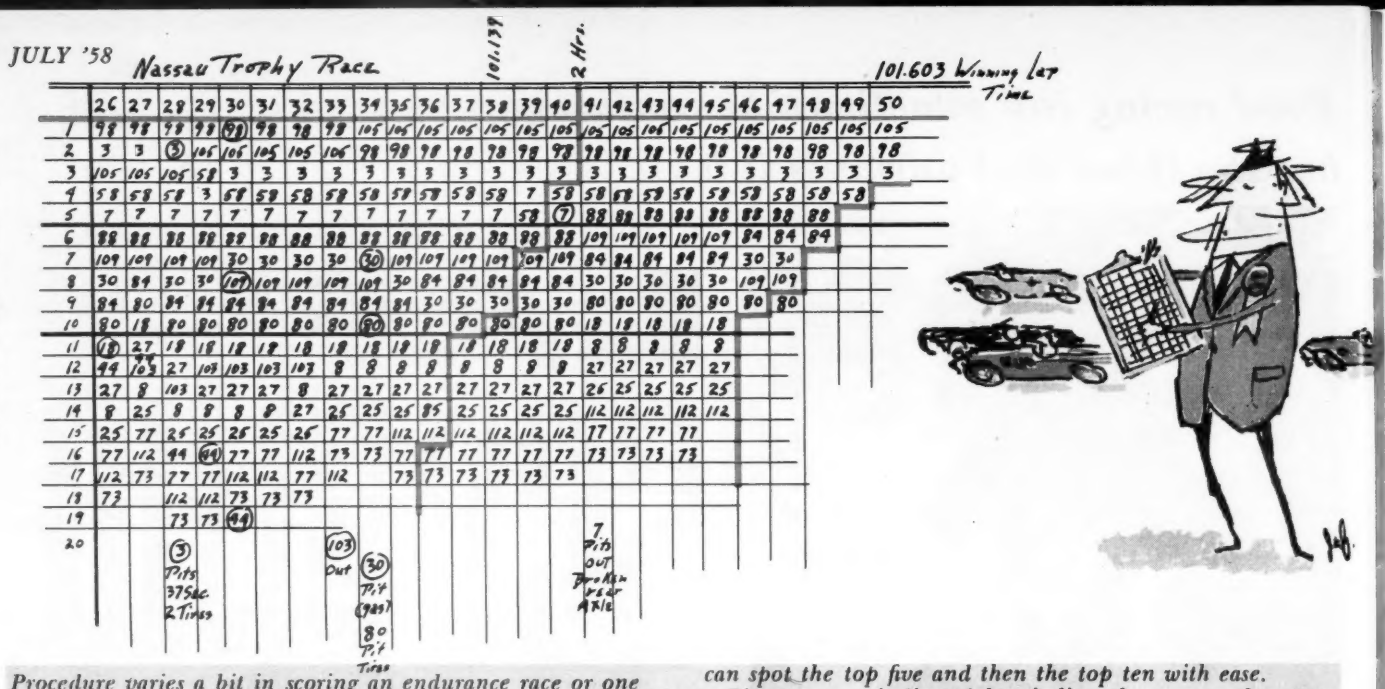

*By Sherrie Zuckert*

EVER WONDER how the winner of a race is determined? Them that gets there firstest with the mostest of course, but with so much mostest going on, especially for anything over 5 laps, it can become rather difficult to pick out the one car that is leading the field; especially if the field is all around him and he is lapping the slower cars. So lap scoring (or lap charting—it's the same thing but no one's sure just what it's called) was invented.

Before you experienced race goers turn the page to find a more advanced topic, linger a while and remember back to when you stood at a fence at your early races and wondered what lap was going on, and how that stock MG happened to be in front of all the Alfa Veloces. As a matter of fact, you will probably only have to think back to the most recent race you've seen.

Lap scoring is merely a matter of recording the number of each car as it passes in front of you. But it is a most vital matter, for without it no one, not even the drivers, can be certain of how a race is going.

A lap chart resembles graph paper and is read like a graph. The number of cars in a particular race are listed in a column down the far left side of the chart. Across the top are the number of laps involved. As the race progresses, the blanks on the rest of the chart are filled in. What you have at any time during the race is a visual picture of exactly what's going on. At the end, you have a permanent record of each car's progress. The group running the race has its own team of scorers and timers recording the laps. Their object is absolute accuracy—they are the officials. However, don't ever ask an official scorer who's leading who during the race. He has no way of knowing.




*Procedure varies a bit in scoring an endurance race or one that is exceptionally long, as in the above case of the 250 mile feature event of Nassau's Speed Week. The course was almost 5 miles long resulting in 50 laps at the end of the 250 miles. As in an endurance race, the cars positions are recorded at the end of hourly periods by drawing a heavy line down the chart starting with the leader's place at the hour mark. Above we see that at the end of two hours: cars #7, 58 and 88 lay one lap behind the leaders, cars 109 through 30 two laps behind, #80 three laps, #18 through 112 four laps, and so down the line. In the above case only 17 cars are being carried as to record the entire field would have been almost impossible. At the end of the race, a final heavy line is drawn to once again, indicate just where everyone stood lap-wise. The other heavy lines, going across the chart, are for the convenience of the track announcer so that he can spot the top five and then the top ten with ease.*

*Pit stops are indicated by circling the cars as they pass on their way into their pit. If there is time (this happens rarely) details of the stop are recorded below the chart, under the same lap. Car #3 (Phil Hill) made a stop in the 28th lap for two tires—the stop took 37 seconds and Phil lost one place, returning to the race in 3rd position where he remained until the end. Meanwhile the chart shows that #105 (Moss) gained second place, caught up to #98 (Shelby) when Carroll pitted and though #98 did not lose his position at the immediate time, Moss soon passed him to win.*

*Occasionally, when it is tabulated on the spot or made known, the top average speed of a lap is included on the chart. In this case Moss's average for the 38th lap was 101 mph. The overall average speed of the race as recorded above the last lap was 101.603 mph.*

*Official timing stand. Each timer is responsible for two cars; each records the time (by the clock) that his cars come by. Extreme correlation is required at end.*

Official scoring is done in varied ways. A method used by the officials at Nassau, and again at Sebring is done with mechanical flip cards. These cards are numbered consecutively and flip into sight at split second intervals. A large group of scorers are assigned individual cars to track. When a scorer's car comes by, he notes what time is on the flip card and records this. At the end, after extensive tabulation, the race is officially compiled. At Sebring (and Le Mans) official hourly reports are handed out to the pits, where the pit's scorer double checks his own chart and corrects where necessary.

A lap scorer is a vital member of any pit team, and none of the factory teams would think of racing without one. Where racing is for money, it is a serious business, involving business strategy. And how can you out-fox your opponent if you don't know where either of you stands? Also, without scorers there would be no pit signals, and lap charts are from whence GO signs stem.

Taken for granted at club races is the race announcer. He keeps up a running commentary on who's doing what. How does *he* do it? Let's take Art Peck, official race announcer for SCCA in the east, as an example. Art works with a copy of the race line-up in his hand and a lap scorer beside him. A glance at the chart tells him that the third place car is no longer with us. A glance at his line-up tells him who it is, and the public is informed. At Nassau, we were working on one side of the track, and the official scorers were directly opposite us—on the other side. Art is a clever announcer, but without a chart, even he would be wondering what lap the race was on. This, despite a vast memory packed with sports car data.

So you sit and record everything you see coming by you—easy—until things start happening, and things always happen fast. The flag drops and the pack takes off. As they come around, completing the first lap, they are usually in a bunch, and at that time it is useless to try to get all the numbers neatly into the little squares on your chart. So you borrow the nearest piece of scrap paper and, without looking at the paper, write down as many numbers as you can get as the cars go roaring by. When you miss a car you draw a line in its place. If you don't, your chart will not be accurate; in fact, it will be a mess. The positions will be all wrong.

After the pack has gone by, you can use the lull to put the numbers into their proper squares on the chart.

The first few laps are fairly easy, as the race has strung out and you have time to put the numbers where they belong. Then all of a sudden five cars will come by, dicing almost fender to fender at 100-plus miles an hour. Back to your scrap paper, only this time a little faster, as you have all the other cars to record, too. About this time you're apt to be working on three separate laps; by now faster cars will be lapping slower ones furiously on the course.

When the leaders come by before you've completed a full column, you place them at the head of the next column where they belong. In the meantime, continue filling in the stragglers of the last column. This all sounds rather frantic, but actually, it's not too difficult. As you continue to record the numbers, they become almost automatic and you know just when to expect most of the cars. If you forget, you can glance at the preceding laps on your chart and ascertain which cars should be in what position.

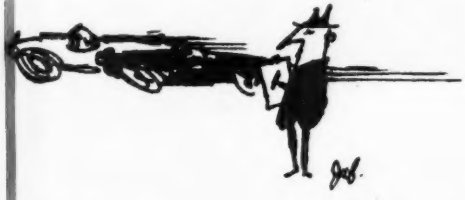
Methods vary very little in scoring anything from a 25 lapper to the twelve hours of Sebring. In the longer races, and of course in an endurance contest, you will also be recording pit stops.

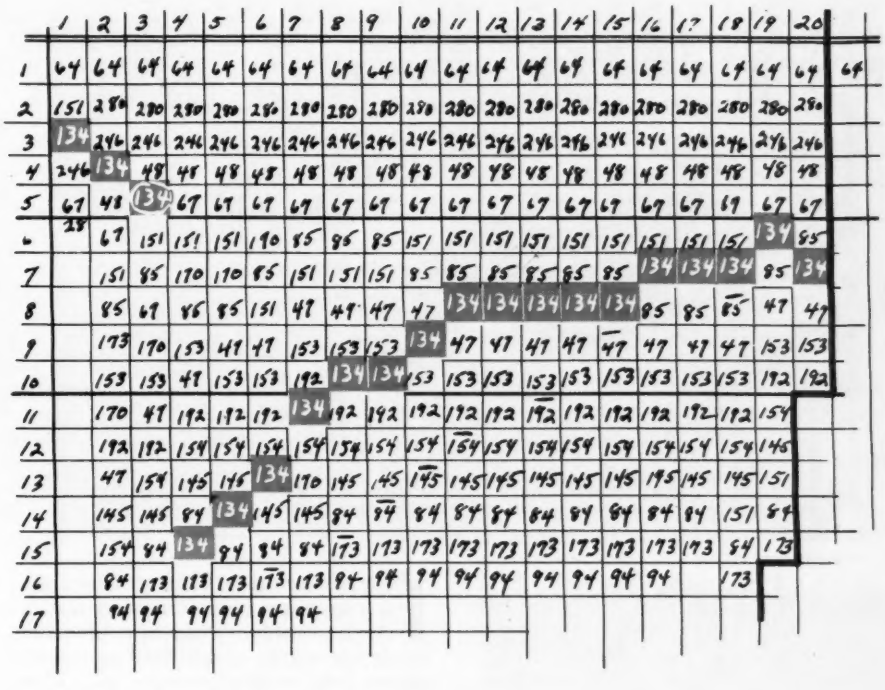
When a car is missing—doesn't come by anywhere near where it's supposed to be – continue putting down the numbers as you see them. Don't draw a line for the missing car as, obviously, his position has changed. If you are sitting where you can see the pits, as he comes in, put down his number if he passes in front of you *in the position he would be in if he were on the course and had dropped back behind the pack*. Circle the number and at the bottom of the column, indicate that this car went into the pits. As he comes out, put him back on the chart again in the position he would be in if he had been on the course and dropped back as other cars passed him. Usually, in an endurance race, a leader is so far ahead that he may not lose his position, since the other cars have a few laps to go to catch up to him.

In a race involving more than twenty-five cars, it is advisable not to try to carry all of them. What counts most is the first fifteen, or in specific cases, the particular car you are trying to track. In regional and national races, you will probably be able to keep track of the whole field for each race: at something long and international, it would be impossible.

The races we are mainly concerned with at present are the regional and national club events. If scoring sounds like dull tedious *work* against the fun spirit of the usual pit hanger-on, remember this: instead of just standing and watching a number of cars go by and occasionally spotting one's own driver, a person who is keeping a lap chart is the *only* one who knows the exact progress of a race. It's well worth it.

*Sherrie Zuckert*





*An example of a frantic first lap. Second lap was completed through use of scratch pad recordings and the rest of the race scored accordingly. Car #134's progress as recorded on the chart was: 3rd in the first lap, going down to 5th on lap 3 where the driver spun (in front of the scorer in this instance). He returned in lap 4 in 15th position, having lost 9 places. The chart follows his progress up through the pack and shows that he eventually ended up 7th over all. The lines drawn over various cars lying low on the chart indicate when these cars were lapped by the leader. The lead car's progress through the pack behind him is recorded through the use of these "lap lines" and on this chart is shown that #64 lapped all but the top six cars by the end of the race. The above chart is a classic example of how an entire race can be permanently recorded. By retaining and studying charts of his races during a season, a driver acquires a better awareness of how he is doing and also can ascertain (knowing the cars and drivers that the numbers represent) which opponents are, in general, the most threatening and what kind of race they usually drive.*

*Nurburgring, '37: Rosemeyer during a lightning-fast pit stop. Auto Union's best time for replenishing fuel and lube, and changing 4 tires, was 28 Sec.*

Photo Credit: Prof. Eberan Von Eberhorst

*EDITOR'S NOTE:*
*The author recently had an opportunity of discussing his subject in close detail with Prof. Eberan von Eberhorst—the only technician still living who was engaged on racing development at Auto Union prewar—at his home in Dusseldorf. Eberan presently heads Engineering Research at the Batelle Institute in Frankfurt, and retains his connection with German motor sports as president of the National Sports Commission. All photos reproduced with this article are from the professor's personal collection.*

IN RECORDED HISTORY of the rear-engine Auto Union, counterpoise to the conventional Mercedes-Benz in the era of Germany's Grand Prix supremacy before WWI, fallacies come out *uber alles*. Keystone myth is that from an early stage of the project, Auto Union wanted to junk the rear engine layout but were forbidden to by Nazi edict, because this would have admitted the fallibility of German brains. Untrue.

Another legend has it that the Nazi government directly exploited the lessons of racing for warmaking purposes. In Auto Union's case anyway, they didn't because they couldn't. When the shooting started a panel of military boffins visited AU's racing department at Zwickau, in Saxonia, and did a toothcomb job on all the wonders there displayed. They departed empty handed. Not a thing worth having had come up in the trawl.

Popular misconception number three, based on ignorance of an earlier racing epoch, is that the Auto Union was the *first* grand prix car to have its engine in the rear. In fact, a team of Benzes with this turnabout construction had run in the European GP at Monza in 1923. The Benzes, like the Auto Unions of the following decade, featured swing-axle rear suspension. In one respect, namely, the inboard mounting of the rear brakes, the Benz design was even ahead of AU's future thinking.

The only personal link between these two ventures was one Willy Walb, who drove for Benz at Monza in '23 and became Auto Union team manager when the Zwickau consortium of trademarks—Horch, Wanderer, Audi and DKW—hit the grand prix scene ten years later. Walb held the *rennleiter* post for two years, then was succeeded by a male duet comprising the massive and impassive Dr. Karl Feuereissen on the one hand and Obering Jakob on the other. Feuereissen took care of the administrative and organizational side while Jakob was the titular engineering boss. In practice, though, most of the active development and research work continued to devolve upon a small team headed by Dr. Ing. (now Professor) Robert Eberan von Eberhorst, an Austrian and thus the compatriot of Dr. Ferdinand Porsche, creator of the original P-Wagen Auto Union. Eberan was the only top level technician whose association with Auto Union's racing and record breaking enterprise lasted its

***The men of Auto Union put 550 horsepower on an ordinary road and still controlled the . . .***

# TURNABOUT TORNADOES

*Nuvolari never hit true form on Auto Unions, but Bernd Rosemeyer, who never drove anything else, made the Turnabout Tornadoes eat out of his hand. Eventually, they took a lethal bite from him.*

***By Dennis May***

whole six-year lifetime. Porsche quit when the 750 kilogram formula expired at the end of 1937, and his sole legacy to the V-12 3-litre car they raced in 1938 and '39 was its engine position. Like its 16-cylinder antetype, it hitched the horse behind the cart.

Although it's true that the shared invincibility of Mercedes and Auto Union in racing and record breaking was avidly exploited by the Nazi propaganda machine in fostering the *Herrenvolk* fairy-tale, these firms were, contrary to a fable that has gained credence in Britain and the U.S., by no means the mere puppets of National Socialism. In the first place, the extent of the subsidies they received from the government has been grossly exaggerated. Over the total period in question, 1934 to '39 inclusive, the state footed approximately one tenth of the Mercedes racing bill, and around one sixth of Auto Union's. Mercedes spent so lavishly on speedwork, however, that their tenth amounted to far more than the rival's sixth.

Auto Union, for their part, went into grand prix racing for two reasons, in this order of rating: one, they figured the publicity accruing from the expected victories would make it a worthwhile business investment; two, they were wholesomely interested in the state award of $200,000 per year that was being offered to *fabriks* successfully contesting the grands prix . . . but without being under any illusion that this purse would come near to covering their costs.

Once in the act, there never was any question of their being chained to the rear engine concept. They could have changed any time they liked. Within the organization itself, Porsche and his technical associates at no time wavered in their back-to-front convictions. It isn't even arguable that Porsche's sub-savants privately regarded the rear engine as a bee in the old man's bonnet but didn't dare tell him so. If this had been the case they would obviously have reversed the architecture when his impending departure from Auto Union became known in 1937, and they were given *carte blanche* to design a new car to fit the 1938-*et-seq* formula.

What they did do, of course, was to shift the cockpit back about 10 inches on the chassis, thereby minimizing the one real drawback of rear engine location—lack of advance warning to the driver when wheelspin started a slide.

Porsche and his disciples had never underrated this snare, but they always contended it was outweighed by the advantage—only possible with the clockwork at the back and appropriately located tankage—of a virtually constant center of gravity despite wide variations in fuel load. In orthodox designs, subject to pronounced C.G. shifts as the tanks emptied or were replenished, compromises in relative suspension rates, front and back, were unavoidable. The Auto Union never suffered from this handicap, giving rise to the backhanded tribute that "its unpredictability anyway was predictable".

On points, Mercedes had the edge on Auto Union in the principal European *grandes epreuves* of the 1934/39 period, as the following rundown shows: French GP, two wins for Merc, one for AU; German GP, three to two in favor of Mercedes; Swiss GP, four to two for Mercedes; Italian GP, three to two for Auto Union; Belgian GP, two to one for Mercedes. Totals: Mercedes 13, Auto Union 9.

Nevertheless, the relative circumstances of the two camps being what they were, Zwickau's 41% share of the big prizes was nothing to be ashamed of. Combined resources of the four makes comprising Auto Union were inferior to the opposition's, for one thing. Daimler-Benz AG, to give the Stuttgart outfit its formal title, was more liberally subsidized by the state



*TOP: Team manager Walb, driver Stuck, and designer Porsche at Montlhery training for Auto Union's very first race, the '34 French G.P., a fiasco for both German teams. Walb was fired as a scapegoat following '35 season. CENTER: The 750 kg. Auto Unions were seldom more than a couple of pounds inside the weight limit. Here's how they sweated off a few more ounces. BOTTOM: Hans Stuck on 3 liter V-12 leads a Maserati through a Monza curve during '38 Italian G.P. Nuvolari won this one*

than Auto Union, as already mentioned – possibly because of personal ties existing between Hitler and members of the pre-war Stuttgart hierarchy.

First to last, moreover, the Mercedes racing department enjoyed an incalculable advantage insofar as the company's top brass included several oldtime race drivers. These men naturally had a great understanding and sympathy for their subordinates' grand prix aspirations. The AU directorate, on the other hand, was devoid of this enthusiast element, though not always lacking, unfortunately, in people who *thought* they knew how a grand prix team ought to be run. Eberan tells an amusing story to point up this handicap.

At a time during 1935, when Auto Union fortunes were at a low ebb, Porsche, Walb and Eberan were summoned into audience by an AU director who had never watched an automobile race in his life. In a few words (for his plan anyway had the merit of simplicity) he unfolded the master strategy whereby the tide of battle was to be turned in the upcoming of Grand Prix of wherever it was. "I shall take up my position in the tribunes", the sage explained, "immediately back of our pit. In my pocket I shall have a whistle. At the start of the race and until signalled to the contrary, our team will hang back and let the competition make the pace. When the time is precisely ripe I shall blow my whistle. You will then relay my order to the drivers, who will accelerate to full speed and go through to the lead".

It is trite but true to say that, by comparison with Mercedes, Auto Union suffered from a dearth of drivers capable of doing justice to power-weight ratios that had never been approached before in road racing and probably never will be again. Price desideratum for mastery of this snub-nosed bomb was a backside with college degrees and built-in equipment for telegraphing its findings to the brain – but *fast*. The one man with a double endowment of this posterior scholarship – Bernd Rosemeyer – developed his Auto Union driving technique to a level of virtuosity that even Nuvolari couldn't match. (Ken Purdy in assessing the relative greatness of Nuvolari and Fangio in *SCI*, significantly never mentioned the Auto Union phase of the fiery Mantuan's career: not that it was a fruitless phase, unless you discount a victory apiece in the Italian, Yugoslav and Donington Grands Prix).

Expertize in Auto Union handling was, in the nature of the design a specialized skill and past experience in other makes tended to be a liability rather than an

asset. Rosemeyer, who knew how it felt to travel fast by virtue of a motorcycle racing apprenticeship on DKW machines, nevertheless had nothing to unlearn in terms of car driving. Nuvolari, by contrast, had everything to unlearn, and hence was at first as prey to faltering and maladroitness as a philatelist in boxing gloves.

When the chirpy, humorous, life-loving Bernd Rosemeyer crashed fatally on the Frankfurt-Darmstadt autobahn in January of 1938, Auto Union suffered a loss they were never to make good. But he went out the way he would have liked, after three years on a wavecrest of idolatry, a master of his chosen craft and sport.

Rosemeyer's *grande epreuve* conquests included the grands prix of Germany, Switzerland and Italy, backed up by double firsts in the Eifelrennen and the Coppa Acerbo, and single wins in the W. K. Vanderbilt Cup, the Masaryk Circuit and the Donington Grand Prix. But mere catalogs of success statistics convey little idea of this young Saxon's extraordinary gift for making the impossible look not merely easy but amusing. His horsing proclivity (which even led him to the supreme indiscretion of burlesqueing the Führer, naturally in private), seldom left him when he was at the wheel of a car weighing around 2500 pounds, driver and all liquids included, and generating nearly 550 horsepower.

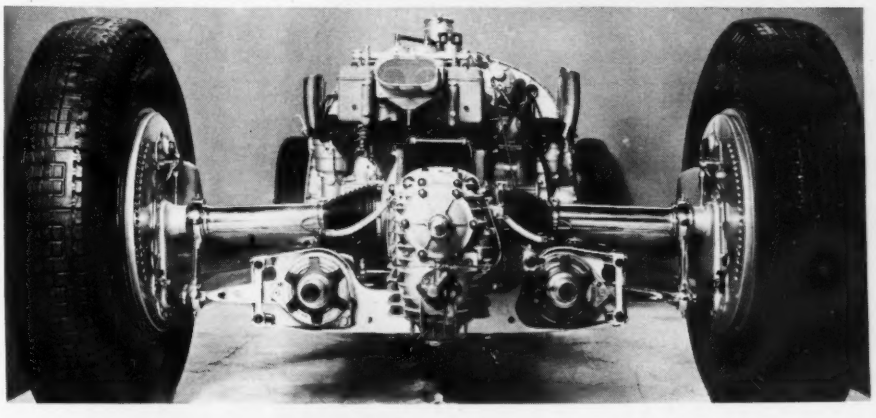
As a characteristic case in point, Prof. Eberan recalls an incident that happened during autobahn tryouts preparatory to standing start record attempts late in 1937. Tires for all the prewar German grand prix and record cars were built by Continental, and it was regular routine for this firm's specialists to do the tire fitting themselves. The time in question, however, no Continental man was available when an impromptu addition to the day's test schedule was decided on. So, with slight misgivings, Eberan ordered his own mechanics to shoe a set of wheels for the record car. It seemed this fairly elementary chore was within their capabilities, for on the initial run, east to west, Rosemeyer steered a straight and safe course with evident ease. Turning around as prearranged, the boy then headed back over the course, west to east. Close to the end of the trap, well within sight of the attendant knot of luminaries and artisans from Zwickau, the car started to snake. With a horrifying rhythm, the tail lashed around in ever widening arcs until there was just feet to spare between the spinning back wheels and first one shoulder, then the other. Convinced this was the payoff for an amateur job of tire fitting, Eberan stood rigid and speechless, waiting for the end . . .

As suddenly as the spasm had started, it finished. Rosemeyer got back onto his beeline, completed the run and rolled to an orderly standstill. When his audience came panting alongside, pale from shock, they found him laughing all over his face. "Skids? Oh, those", he said. "I did 'em on purpose. Just wanted to see how the thing would respond if I played bears".

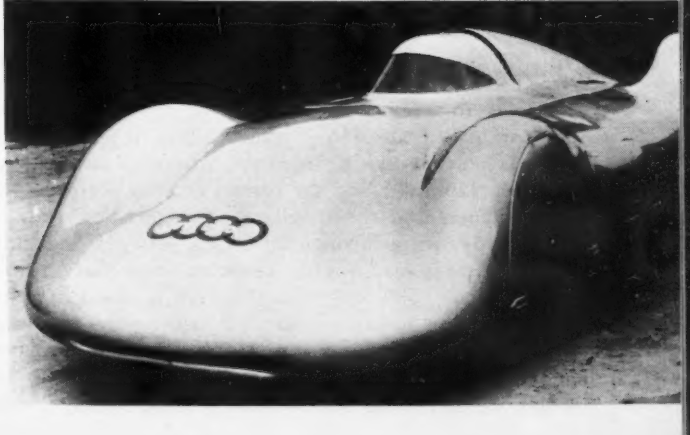
Rosemeyer was a showoff, but his brand of exhibitionism was so juvenile and prankish it never got him disliked. The last of the 750 kilogram Auto Unions, almost twice as powerful and scarcely heavier

*Short-statured Nuvolari, his head well below top of engine cowling, cornering on his winning drive in V-12 AU during '38 Italian G.P.*

*Swing-axle back end of '36 V-12 AU racer with torsion bars, replacing transverse leaf springs, run lengthwise in frame tubes.*



*Robert Eberan von Eberhorst relaxing at his desk in Dusseldorf, post-war hometown of Auto Union.*



*Experimental streamliner built onto 6.3 liter chassis in '38, but never used after Rosemeyer's tragic accidental death.*

# SIMCA Montlhery

## SCI ROAD TEST:

YOU ENJOY a kind of exclusiveness when you drive a Simca. It's a car that looks frisky and sound, and it makes you feel that way, too, when you drive it. Strangely, Simca has not until recently exploited the publicity value of such things as maintaining an average of better than 70 mph for 37 *days* in a *stock* machine at Montlhery, the "French Indianapolis" for which the car is named, but it is certainly a strong testimonial to stamina and durability.

Looking under the hood at the size of the engine, it's hard to understand how so few cubes can give such big performance. Possibly it's a tribute to high specific output and well-chosen gear ratios, but whatever the reason, the Simca 1300 Montlhery keeps up with the traffic and accelerates with the big cars.

Reaction to accelerator belies engine capacity, just as the four-door-sedan body styling is misleading in terms of roadability. When you swing out to pass a line of slow cars, you have both the power and the correct gear to keep you from hanging about, and the handling characteristics allow you to effortlessly swing through a sudden bend, if one should pop up. This is meaningful, when one considers a swept volume of only 1300 cc — a lot less than is found in a great many underpowered cars that are absolutely frustrating to drive — and the engine is pushing a full-sized far-from-Spartan sedan.

When we picked up our Montlhery from Simca, Inc., the odometer registered between ten and twenty miles. Since no one with a conscience will wind out a machine without running it in a bit, a few familiarization miles were in order. Again, anyone who's read road tests under this by-line knows that snow on the ground automatically means skis on the feet, and to drive a car through metropolitan traffic, over state highways, and across the twisting, narrow cow-paths that Vermont laughingly labels on a road map as secondary roads, is a meaningful road test.

With two aboard, and two pairs of skis attached to a roof rack borrowed from Alpine Ski Shop, we entered the Friday afternoon Metropolitan traffic, which has the qualities of being at the same time severely congested and exceedingly rapid. The nimbleness of the Simca, jumping through small openings that close almost as fast as they open, was rewarding. Downshifting into third — or even second and first, at times, is a natural movement, and the range of the engine-gear combinations allows an experienced driver to leave the six and seven liter boys wondering what kind of car that was that just went by.

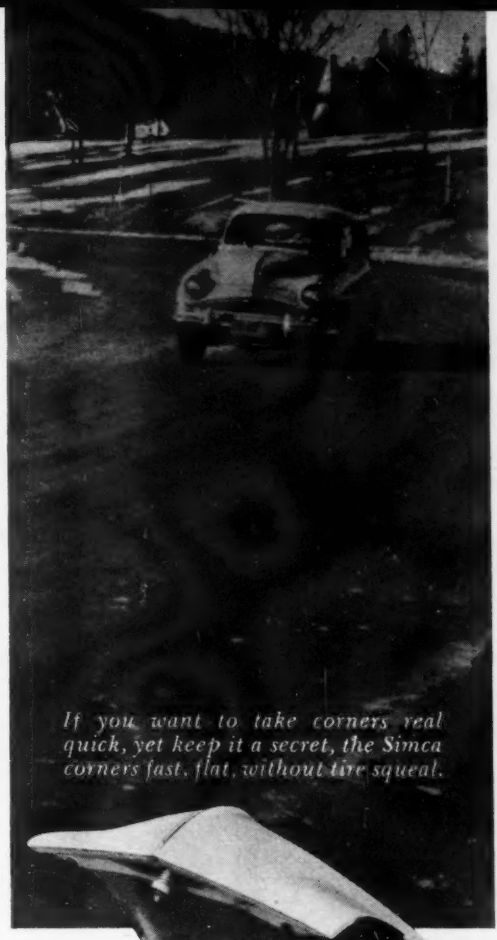
On more open roads, the Simca settles to a happy cruising speed of between sixty and seventy, indicated. If you wish, you can go higher without feeling that you are abusing the engine. You get very little wind noise, but you will be aware of the engine's exhaust system. It's not offensive; on the other hand, we liked the roar. It gives one a feeling of power.

But all roads are not straight, and if you are going to maintain high average speeds, which is the purpose of a sports-type car, you have to have a suspension system that will allow you to corner without applying brakes. We were amazed that this four-door sedan — so harmless looking on the road that we passed automobiles that were intercepted by the local constabulary for speeding after we had passed them — could barrel into a turn at high speed and come out of it without even squealing the tires. In our opinion, the Montlhery takes a corner better than some bona-fide wind-in-the-face sports cars (no, we're not going to mention names!).

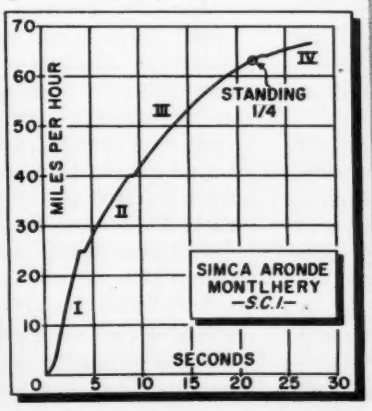
For all-out competition-type cornering, another technique is required. The Montlhery is not a torque machine, so to put it mildly you don't have to worry about wheelspin. When *in* the corner, the side loadings on the tires provide enough drag to slow the car down. Once the stand-on-the-loud-pedal point is reached, the torque just about equalizes this drag. In other words, you'll pull through the corner at uniform velocity, postponing acceleration until the car starts to straighen out.

*(Continued on page 52)*

*Montlhery features standard-equipment adjustable-rake seats, for relaxed motoring or roadside catnaps.*




*Combination of high-output engine and ideal gear ratios gives big-car acceleration with small-car economy. Body is extremely stylish, with ample room for four.*




## SIMCA ARONDE MONTLHERY

**Price at East Coast and Gulf POEs—$1810 basic, $1925 as tested**
**(Slightly higher on the West Coast)**

**U.S. Importer: Simca Inc., 445 Park Ave., New York, N .Y.**

### PERFORMANCE

**TOP SPEED:**

| | |
|---|---|
| Two-way average | 86½ mph |
| Fastest one-way run | 89½ mph |

**ACCELERATION:**

| From zero to | seconds |
|---|---|
| 30 mph | 5.6 |
| 40 mph | 8.8 |
| 50 mph | 13.5 |
| 60 mph | 19.0 |
| Standing ¼ mile | 21.6 |
| Speed at end of quarter | 63 mph |

**SPEED RANGES IN GEARS:**

(6000 rpm max)

| | |
|---|---|
| I | 0-25 |
| II | 9-40 |
| III | 14-64 |
| IV | 21-top |

**SPEEDOMETER CORRECTION:**

| Indicated | Timed |
|---|---|
| 30 | 30 |
| 40 | 38 |
| 50 | 47 |
| 60 | 56 |
| 70 | 64 |

**FUEL CONSUMPTION:**

| | |
|---|---|
| Hard driving | 24 mpg |

**BRAKING EFFICIENCY:**

10 successive emergency stops were made from 60 mph, just short of locking wheels at 2/3 g. Linings began to smell toward the end and additional pressure was needed. By last stop, pedal was nearly on floor, but recovery was very quick.

### SPECIFICATIONS

**POWER UNIT:**

| | |
|---|---|
| "Flash Special" | In-line four, water-cooled |
| Valve Arrangement | Pushrod overhead valves, in-line |
| Bore & Stroke | 2.91 x 2.95 in (75 x 75 mm) |
| Stroke/Bore Ratio | 1.01 /1 |
| Displacement | 77.4 cu in (1290 cc) |
| Compression Ratio | 7.8 /1 |
| Carburetion by | Solex 32 PBICT downdraft with automatic choke |
| Max. Power | 57 bhp @ 5200 rpm |
| Max. Torque | 66½ lbs-ft @ 3100 rpm |

**DRIVE TRAIN:**

| Transmission ratios | test car | optional ratios |
|---|---|---|
| I | 3.69 | |
| II | 2.35 | |
| III | 1.47 | |
| IV | 1.00 | |
| Final drive ratio | 4.44 | (5.38) |
| Axle torque taken by | Rear springs | |

**CHASSIS:**

| | |
|---|---|
| Frame | Pressed steel, monocoque body-frame |
| Wheelbase | 96¼ in |
| Tread, front and rear | 49½ in |
| Front Suspension | Coil springs, unequal wish-bones, anti-roll bar |
| Rear Suspension | Rigid axle, progressive rate semi-elliptic springs |
| Shock absorbers | Telescopic |
| Steering type | Gemmer hour-glass worm and roller |
| Steering wheel turns L to L | 3½ |
| Turning diam., curb to curb | 36 ft |
| Brakes | Hydraulic, leading and trailing shoes |
| Brake lining area | 122 sq in |
| Tire size | 5.60 x 14 |

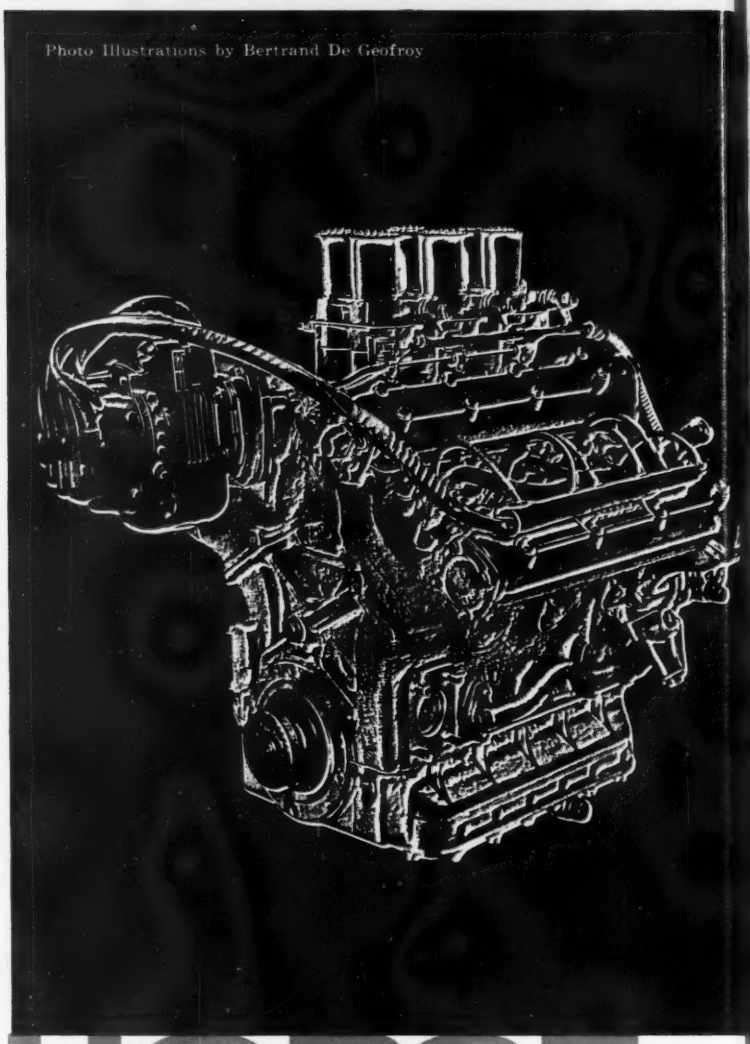
**GENERAL:**

| | |
|---|---|
| Length | 162 in |
| Width | 62 in |
| Height | 58 in |
| Weight, as tested | 2170 lbs |
| Weight distribution, F/R as tested | 52/48 |
| Fuel capacity | 11 U.S. Gallons |

**RATING FACTORS:**

| | |
|---|---|
| Specific Power Output | 0.74 bhp/cu in |
| Power to Weight Ratio | 38.1 lbs/hp |
| Piston speed @ 60 mph | 1875 ft/min |
| Braking Area | 112 sq in/ton |
| Speed @ 1000 rpm in top gear | 15.8 mph |

Photo Illustrations by Bertrand De Geofroy



***If you're passed***

***when you shouldn't be,***

***you're up against . . .***

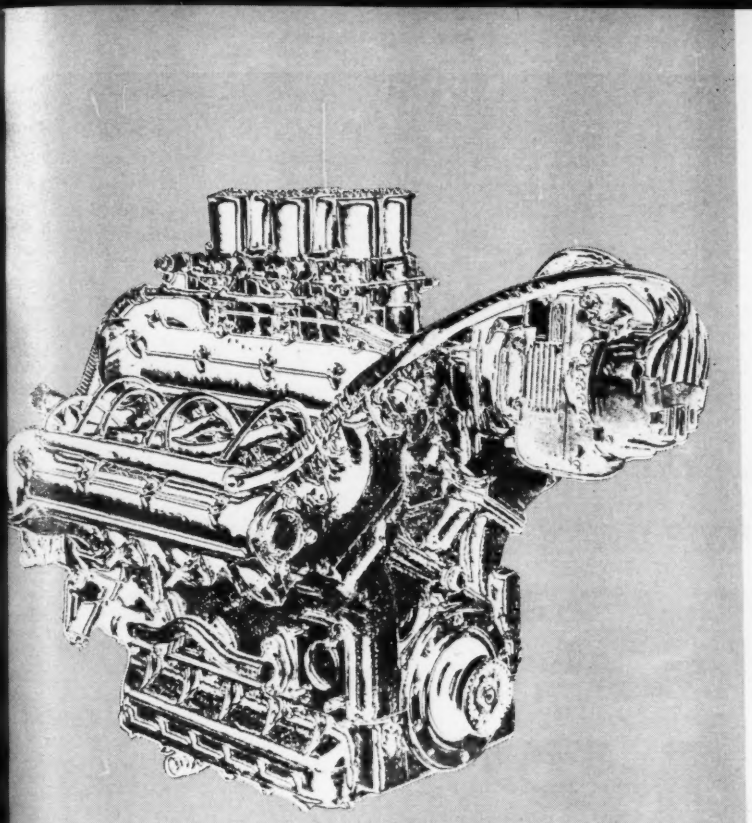
# TRUE HORSE-

TAKE a 70-horsepower Porsche Super coupe and run it alongside a typical late Detroit 6-cylinder stick-shift sedan of around 125 hp (Rambler, Plymouth, etc.). The Porsche walks the Detroiter like it was anchored. On paper it shouldn't. Based on the manufacturers' horsepower ratings all the cars would have a weight/horsepower ratio in the neighborhood of 26 lbs/hp—and acceleration should be comparable. So check this: the Porsche engine puts out more honest horsepower at the clutch—*in relation to its advertised rating*—than the Detroit products.

The first thing to consider here would be some of the methods used by the various car manufacturers to "rate" their engines. These methods vary widely from country to country, and from manufacturer to manufacturer.

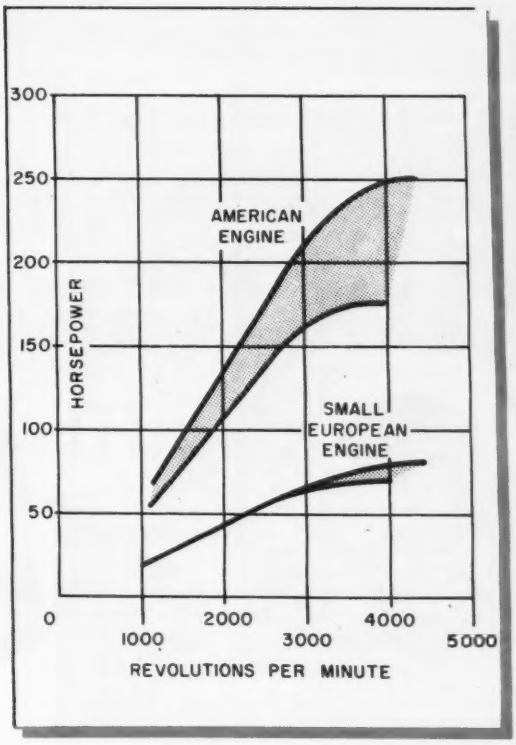
Probably the Germans are closest to Sunday school on the business. Their D.I.N. (Deutsche Industrie Norm) test code —equivalent to our SAE code—stipulates that the engine shall be tested with all normal accessories hooked up and running, as they would operate in the car on the road. This gives a quite accurate picture of true engine potential. On the other hand, the various British, French, and Italian manufacturers don't follow any set code in their testing and rating. Some test the engines stripped of all accessories (generator, fan, mufflers, air cleaners, etc.). Some test with full accessories like the Germans—or maybe just the generator and fan, but no muffler. In some cases they will run full accessories, but the spark advance and fuel-air mixture are adjusted by hand for maximum power. Unfortunately there's no way to tell from published ratings what these test conditions are. Some makers publish two ratings—a "gross" figure, running without accessories, and a "net" rating. But even this net rating can be 10% off the true output on the road.

Here in the States, of course, everything is gross—*awfully gross!* You may not have realized it, but our SAE test code makes no stipulations about accessory loads on full-power tests. It says ". . . only parts essential for engine testing operation need be used. . . ." This can mean anything. In the early days of the horsepower race some of the manufacturers weren't even driving the water and oil pumps on official tests! In 1953 G.M. introduced a new "Test 20" code for their divisions, to be used in determining power and torque for advertising purposes—and this has now been generally adopted by the other manufacturers. In this deal, the engine is tested with the fan belt operating the generator and water pump (but with no load on the generator); no fan, air cleaner, or muffler is used, but stock exhaust manifolds are required. And here's a key point: The spark advance and



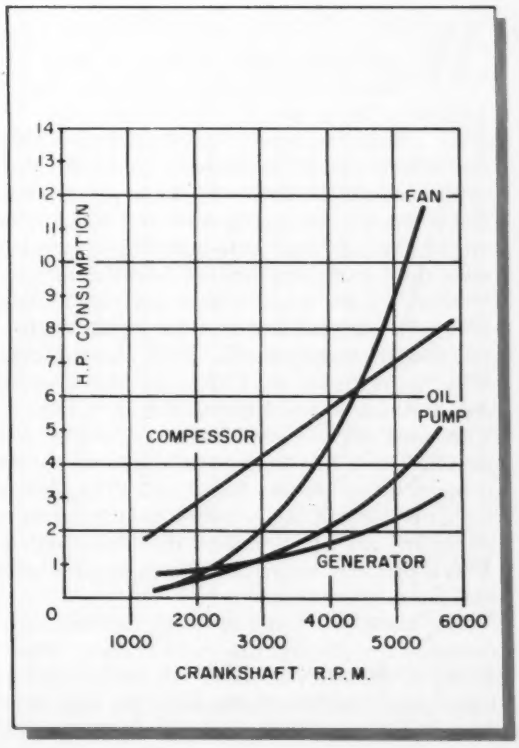
# POWER

*by Roger Huntington, SAE*




*Dotted areas represent typical losses between advertised power curve and power actually delivered to the clutch on the road. Small imports lose 12½%, while bigger domestics surrender 30% to parasitic power losses.*

*Curves show typical variations of power consumption with rpm on various accessories. Ever wonder why on-off fans are popular?*




fuel-air mixture are to be adjusted by hand at each test rpm to give maximum torque; also the exhaust heat to the intake manifold hot spot is shut off.

This is "gross" horsepower for sure.

(Incidentally, we should mention at this point the difference between the metric horsepower—used by German, French, and Italian manufacturers—and the British-American standard horsepower. Our hp measurement is based on 550 foot-pounds of work per second, whereas the metric definition is 75 *meter-kilograms* of work per second. Thus one metric hp represents 1.4% less work than a U.S. figure. The difference is not enough to concern us here, however.)

So far we've been talking strictly about laboratory methods of rating engines. Now let's consider how these figures get chopped up when we drive that "100-hp" engine down the road.

By far the worst power robber is the very air that the engine breathes. Practically all auto manufacturers in the world "correct" their power and torque figures to international standard sea-level atmospheric conditions—or that is, 29.92″ Hg. barometric pressure, zero water vapor, and 15° C. air temperature (59° F.). (The English-speaking countries round off the temp to 60° F.) This is pretty-optimistic. As

*(Continued on page 57)*

***Lacking the long-awaited E-type, Coventry's hopes rest with the***

# LISTER-JAGUAR

Wide World

WELL, THERE'S NO DENYING IT. The American debut of the Lister-Jaguar at Sebring was a bit of a thud. No sooner had Archie Scott-Brown dusted Gendebien's Englebert tire prints off his shoulder, than Eddie Crawford came cruising into the pits with engine problems. Both cars out in the first thirty minutes, and both through no fault of the chassis. To drive the latter point home with clarity, Cunningham's remaining entry and both the Scottish entries, all 3.0 D-types, were soon suffering valve maladies of their own, the lot of them retiring before mid-race.

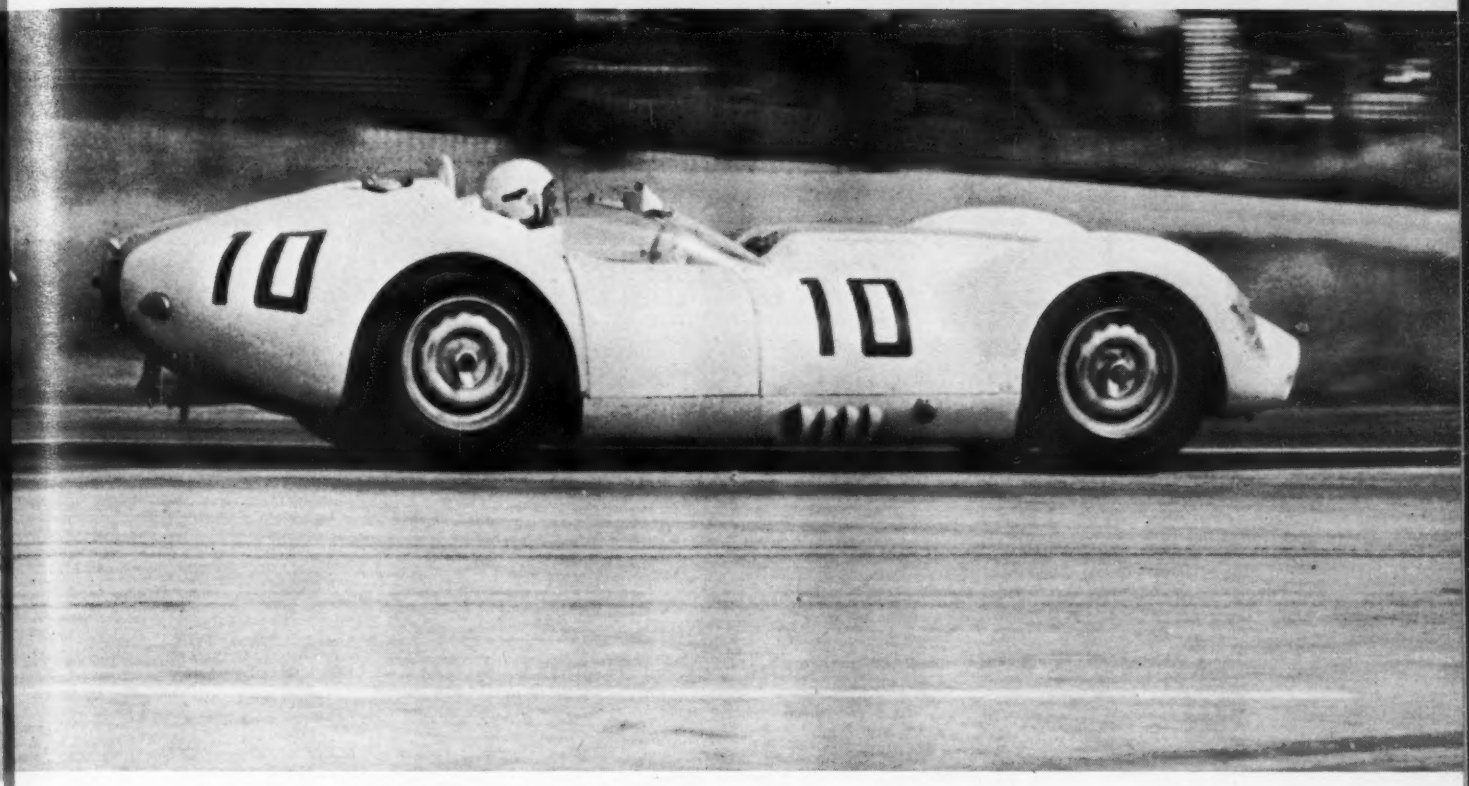
There's a silver lining to every cloud, though. A month later, when a tried and true 3.8 Jaguar engine had replaced the midget three liter mill, Walt Hansgen was able to walk off with the President's Cup at the Marlboro merry-go-round. And this brings us to a very significant point about the Lister. The word twisty just doesn't do justice to this Maryland circuit. Two and a fraction miles per lap, its longest straight is but a shade over a quarter-mile. The ideal car for such a circuit is one that can be tossed around corners with ease and accelerate out of them like the proverbial scalded feline. This is precisely where the Lister's English breeding pays off, and handsomely.

The latest in a series of sports cars designed more or less expressly for the amazing Scott-Brown, Brian Lister's 1958 model is definitely at home on such tracks. It is made in Cambridge, just forty miles down the road from the 2.7 mile Snetterton race course. Here, as at Oulton Park, Archie is absolute king, regularly trampling the opposition under his wheels. To the best of our memory, he has been doing this for several years now, in a procession of Listers powered by a variety of engines.

Skipping the Austin Seven stage that most British designers cut their teeth on, Brian Lister's first car was powered by the ubiquitous highly tuned MG TC engine. This was in 1954. Before the year was out, he had moved to the 1991 cc Bristol engine, enabling Scott-Brown to mow down even the high-priced opposition from the continent at that year's Silverstone International meeting. This was the model which put Brian in business of building cars as well as ornamental ironware, but still unsatisfied, he bought a Maserati engine of the same size in an extravagant attempt to reduce the car's frontal area. (The Bristol, though highly receptive to skilled tuning, is one of the tallest engines around.) This car never materialized as the threat that it appeared to be on paper, perhaps because even the most skillful tuner requires time to learn his way around a strange engine – and also, perhaps, because with Maser parts as scarce as hen's teeth in England, a certain amount of caution may have been exercised.

Having laid an egg for the 1956 season, Brian Lister knew better than to try to hatch it. Instead he went native, and in a big way. For the 1957 campaign, he came up with a D-type Jaguar-engine bolide that provided Archie with some of the rides of his life. In 14 races entered, he and this first Lister-Jaguar won 11 of them. In every case he equalled or bettered the existing lap record for sports cars.

When, in the latter part of that year, the FIA made their controversial announcement that the 1958 Sports Car Championship would be limited to three liters (183 cubic




## ....though the CheV-8 model will be more popular in USA

*by Stephen F. Wilder and Karl Ludvigsen*

inches), not everyone could pull an Enzo and dip into a bagful of old bores and strokes. Briggs Cunningham, who had been carrying the Jaguar banner in the United States just as successfully as the Ecurie Ecosse had in Europe, found himself in a quandary. Even at the beginning of that season, he had had good reason to wonder about his chances with the several-years-old D's. But with the able assistance of Alfred Momo, who had led the way to the 3.8 liter version of the "works D" engine, he was able to enter at least one perfectly prepared car in nearly every SCCA event. And with Walt Hansgen at the wheel, this brilliant car/driver combination outpointed the more showy but less durable opposition.

But if the engine now had to be *reduced* in order to compete internationally, the D-type just wasn't the car to put it in. At Sebring '57, a 3.0 Maserati easily out-distanced the 3.8 injected D. A de-stroked 3.0 could hardly be expected to do better. Reliable to a fault, the D's are simply too heavy for their power to compete any longer.

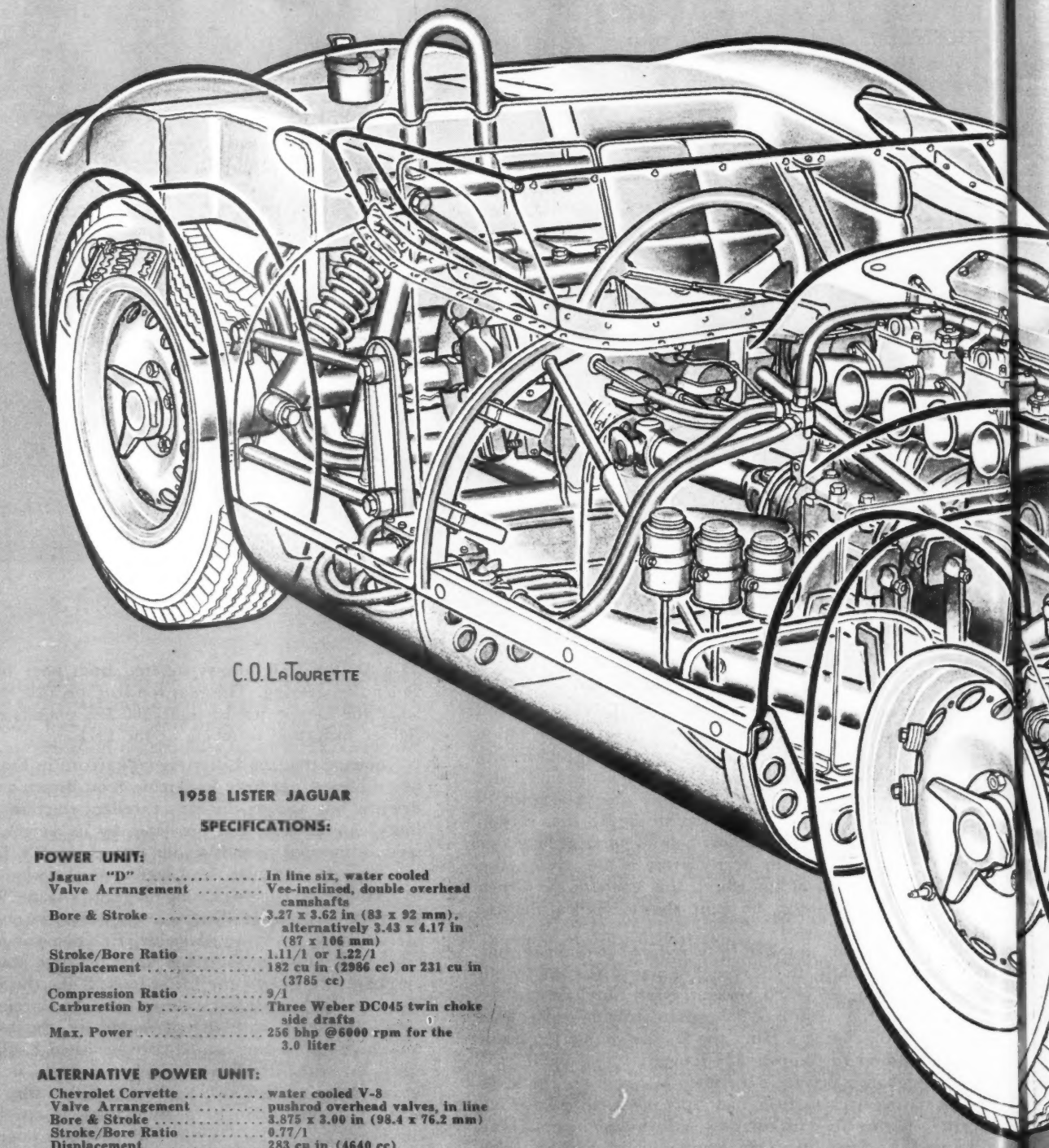
Cunningham's private experiments, based on the C6R chassis dating back to 1955, had sadly not yielded anything worth following up. This complex Weaver-designed machine destroyed its three-liter Offy engine in an Elkhart Lake practice session and lay dormant and dust-covered through 1956. A promising plan to install a Chevy V-8 fell through, and a Jaguar six was finally fitted. It appeared in this form for many 1957 practice runs, but was never raceworthy. A D-type nose section was grafted on, and ducting cut in to ventilate the final drive/inboard brake unit, but compared to a D, the C6R always suffered from poor braking and indefinite steering. This was too bad, because the C6R has what the D-type needs: some 200 less pounds overall and lighter unsprung members at the back.

Knowing that the Lister-Jaguar's record in English racing was achieved not only by Archie Scott-Brown's remarkable driving, but also by the car's excellent traction, its "stickability" at the rear, and not least, by its weight, quoted at several hundred pounds under that of the D's, Briggs Cunningham decided that the Lister might be what he needed to revitalize his flagging racing program. (At the '57 National at Watkins Glen, Holbert was a too-close second in a 1½ liter Porsche, while at Riverside, Hansgen got it from the other side, finishing fourth to four-plus liter Maseratis and Ferraris.) To Briggs, the Lister looked like the E-type that was required but not forthcoming from the Coventry factory.

In connection with arrangements for the forthcoming America's Cup sailing contest, Briggs visited England in the fall of '57 with Alf Momo and Walt Hansgen in tow. They found Brian Lister's car-building facilities very small but neat, and only part of a substantial iron-working and engineering business. While still adequate, much of the machinery dates back to the 1890's, when Brian's grandfather started the concern.

The 1957 Lister-Jaguar was trailered out to the short Snetterton course, and turned loose in the hands of Scott-Brown and Hansgen. Walt liked the car very much—partic-

*(Continued on page 36)*



C.O. LaTourette

**1958 LISTER JAGUAR**

**SPECIFICATIONS:**

**POWER UNIT:**

| | |
|---|---|
| Jaguar "D" | In line six, water cooled |
| Valve Arrangement | Vee-inclined, double overhead camshafts |
| Bore & Stroke | 3.27 x 3.62 in (83 x 92 mm), alternatively 3.43 x 4.17 in (87 x 106 mm) |
| Stroke/Bore Ratio | 1.11/1 or 1.22/1 |
| Displacement | 182 cu in (2986 cc) or 231 cu in (3785 cc) |
| Compression Ratio | 9/1 |
| Carburetion by | Three Weber DC045 twin choke side drafts |
| Max. Power | 256 bhp @6000 rpm for the 3.0 liter |

**ALTERNATIVE POWER UNIT:**

| | |
|---|---|
| Chevrolet Corvette | water cooled V-8 |
| Valve Arrangement | pushrod overhead valves, in line |
| Bore & Stroke | 3.875 x 3.00 in (98.4 x 76.2 mm) |
| Stroke/Bore Ratio | 0.77/1 |
| Displacement | 283 cu in (4640 cc) |
| Compression Ratio | 9.5/1 (or higher; owner's option) |
| Carburetion by | Rochester fuel injection |
| Max. Power | 290 bhp @ 6200 rpm |
| Max. Torque | 290 lbs-ft @ 4400 rpm |

**DRIVE TRAIN:**

| Transmission ratios | Jaguar | Chevrolet |
|---|---|---|
| I | 2.15 | 1.87 |
| II | 1.65 | 1.54 |
| III | 1.28 | 1.22 |
| IV | 1.00 | 1.00 |
| Final drive ratios | 2.93, 3.31, 3.54, 3.77, 4.09, 4.27, 4.55, 4.78 | |
| Axle torque taken by | differential casing | |

**CHASSIS:**

| | |
|---|---|
| Frame | Welded tubular steel frame |
| Wheelbase | 90¾ in |
| Tread front and rear | 52 and 53½ in |
| Suspension, front | Parallel, equal length wishbones, coil springs |
| Suspension, rear | de Dion tube, four trailing arms, coil springs |
| Shock absorbers | telescopic, in unit with coil springs |
| Steering type | Morris Minor rack and pinion |
| Steering wheel turns L to L | 2.0 |
| Turning diameter | 40 ft |
| Brakes | Girling 12 in disc, quick-change pads |
| Tire size | 6.00 x 16 front, 6.50 x 16 rear |

**GENERAL:**

| | | |
|---|---|---|
| Length | 162 in | |
| Width | 62½ in | |
| Height | 39 in (27 in at cowl) | |
| Weight, dry | 1920 lbs with Jaguar engine, gearbox | |
| Weight distribution F/R | 48/52 | |
| Fuel capacity | 45.6 U. S. gallons | |
| Price | with Jaguar engine | $10,376 |
| | with Corvette engine | 9,650 |
| | less engine, gearbox | 6,604 |
| | stripped chassis | 4,340 |
| Distributors: | see text | |

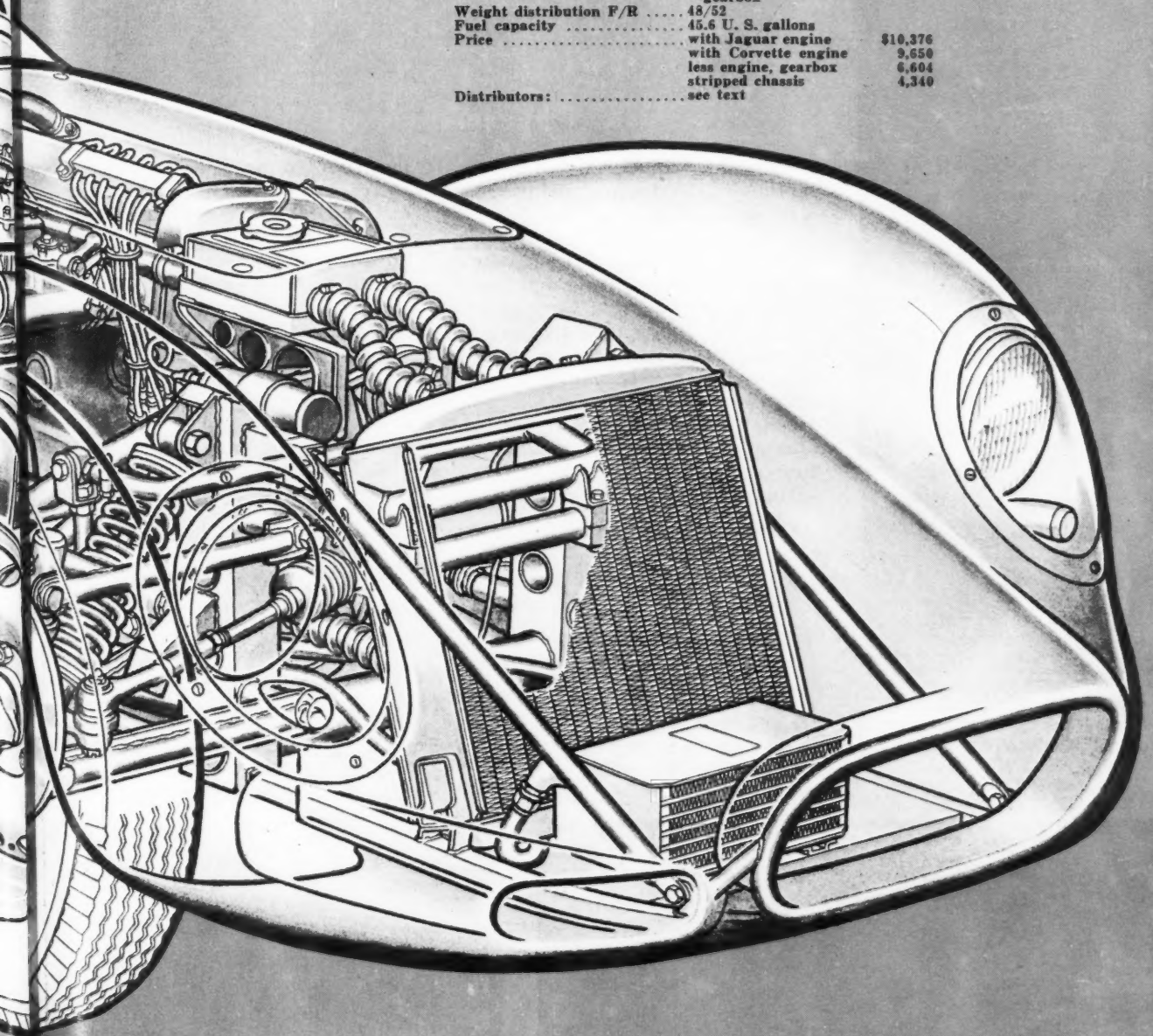



Photo : Wide World

*Last year, Archie Scott-Brown won 11 out of 14 races in England with the first of the Lister-Jaguars.*

*Twin pumps and fuel shut-off valve to the right, accessible starter (for emergency repairs) to left. Convenient lever shifts gears remotely.*

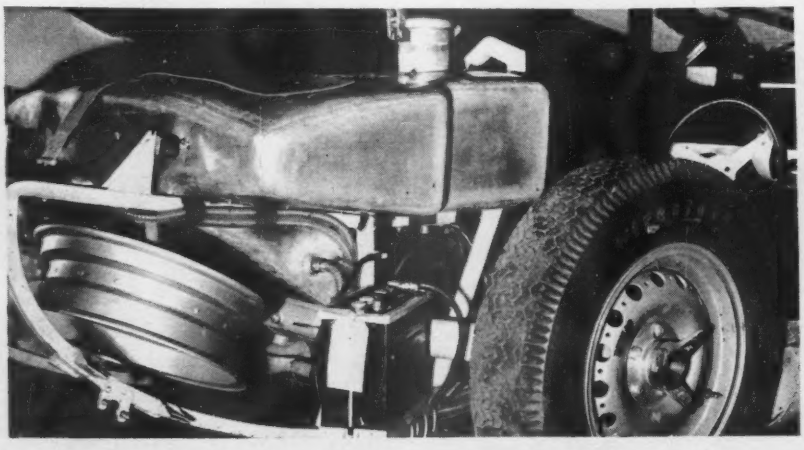
*As soon as the first two Lister-Jaguars arrived, Briggs Cunningham, right, gave them to Alfred Momo, left, to check.*

ularly its high cornering speed and the de Dion rear's traction — and posted a time just a second longer than Archie's best for the course. Scott-Brown in turn expressed relief that Hansgen wasn't staying over there to run against him!

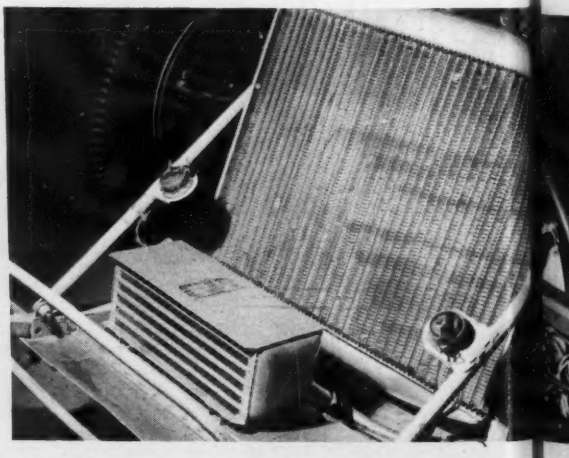
All parties satisfied, Cunningham placed an order for three cars, two to accommodate a Jaguar engine and the other — at last — to be built around the larger yet lighter Chevrolet V-8. The first two showed up at Sebring and the Chevy version is expected to arrive in June or July.

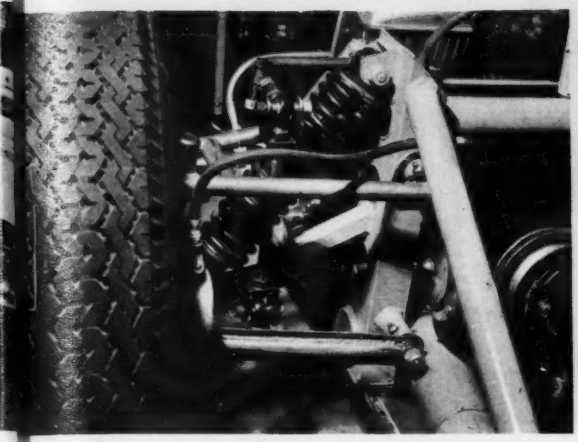
The word got around back here in the States and the following jumped to sign themselves up as distributors: Tom Carstens of Tacoma, Washington; Carroll Shelby of Dallas, Texas; and Auto Engineering of Lexington, Mass. They are all more interested in the CheV-8 version, the first of which will be in this country by the time you read this. It will be in the hands of Red Byron under the sponsorship of Kelso Autodynamics, and with Red's extensive experience in pro racing circuits, it should really get out and move. With all the car orders that have been rolling in, it looks as if Brian Lister (Light

*Momo's first change was to move battery away from the gas lines. Next he attached spare tire with knock-off cap.*

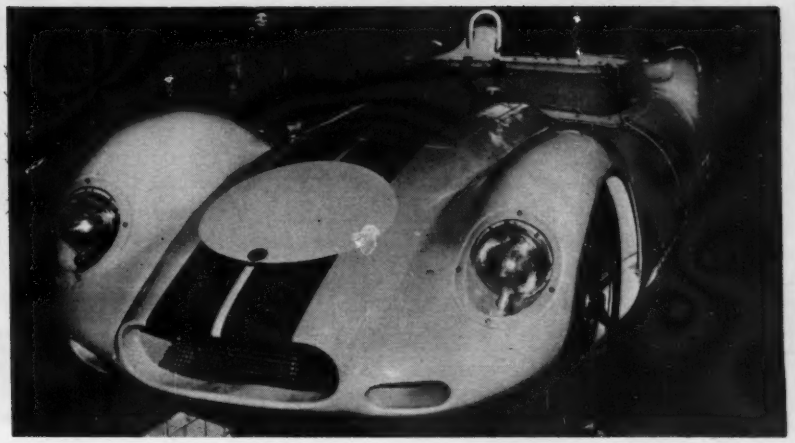


*Two Marston radiators, small one a cross-flow oil cooler, perch way out front. Multi-pin plugs for headlights permit nose shell's quick removal.*





*Parallel, equal-length tubular wishbones are well gusseted. Shackles, anti-roll bar are adjustable to enable "racking" in US track racing style.*



*Outer slots in sleek nose blow air on front brakes; screen in center one protects oil cooler, radiator.*

Engineering) Ltd. will soon be forced right out of the ornamental ironwork business!

The 1958 Lister is a refined version of the '57 car whose successes have already been mentioned. Changes were based not only on Lister's experience but also on certain suggestions of Alfred Momo. Basically it is still the same as its predecessors, being characterized by a tubular steel frame with unequal wishbones at the front, a de Dion set-up at the rear, and coil springs and telescopic shock absorbers all around. This sounds like the magic formula for successful road racing machinery these days, but it's not as easy as all that to build a champion.

Like most successful specials, the basic car is very simple. Two main side tubes outline the frame, which is widest just under the seats. It tapers sharply inward at the rear and more gradually up to two boxed uprights at the front. These are joined by two cross tubes, and there are two more under the seats.

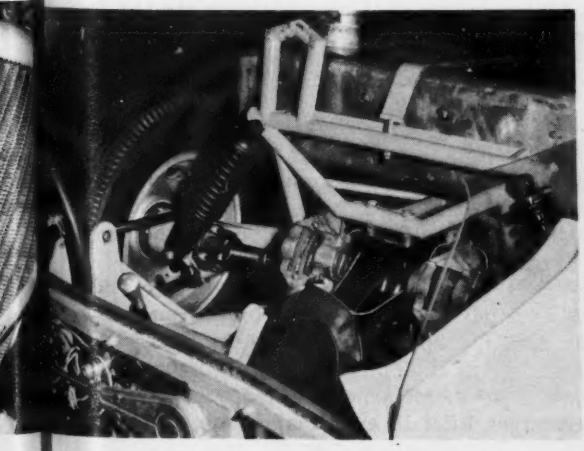
Main tube diameter on the '57 Lister was the same as in the MG and Bristol powered cars: three inches. Gauge was increased from 16 to 14, however. Designed for more rugged, long-distance

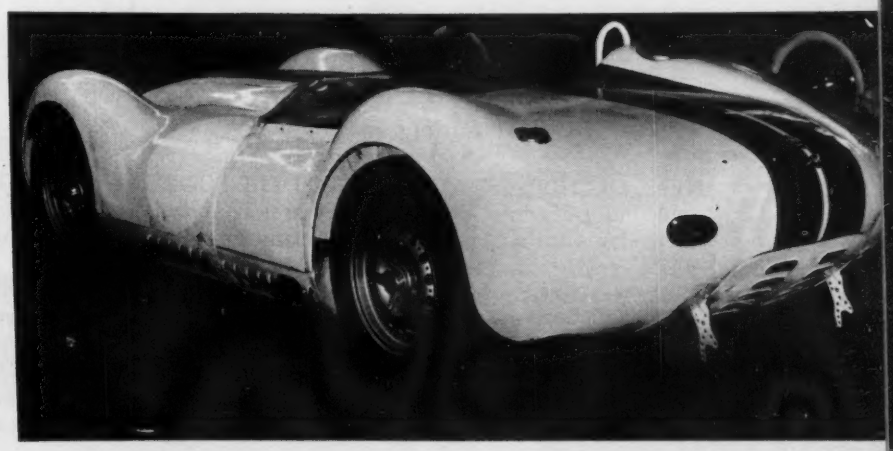
*(Continued on page 63)*

*Crawford, during practice at Sebring. Last-minute changes included forward-facing scoop to get more air to brakes.*

*Monstrous Girling discs are clustered about the Salisbury final drive. Canted coil-shocks simplify tubular frame's superstructure.*

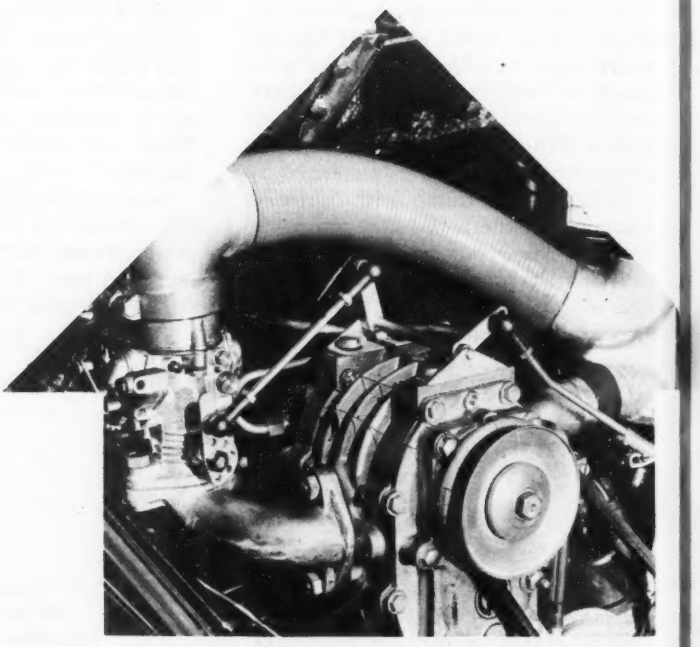
*Bustle back design reduces turbulence back of cockpit. Still wondering how Gendebien climbed on it.*





# the blower route

## *An Up-to-date Road Map for Sports Car Drivers*



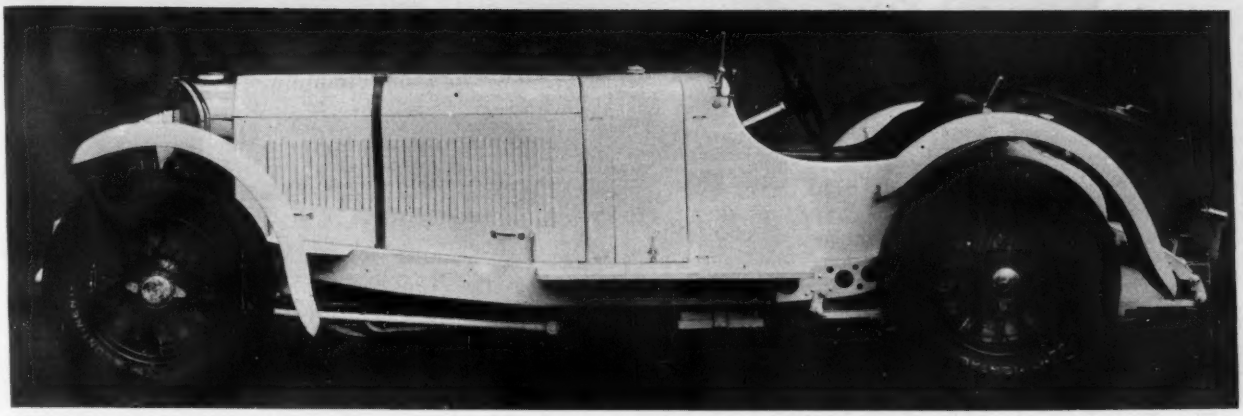
*MAG blower, one of three available in the U.S. for Volkswagen (others: Judson, Pepco) gives the VW Porsche-like go on mild boost of seven psi.*

***by Karl Ludvigsen***

WHEN YOU STABBED YOUR THROTTLE FOOT well and truly into the vitals of a prewar sports Mercedes, Alfa or Bugatti, you heard many delicious noises, but above all was the hard, "I-mean-business" shriek of a supercharger. You can get a similar sound today by winding out a well-used early Porsche in second gear, but the propulsive effect on the small of your back is simply not the same.

During the Twenties and Thirties, blowing apparatus was as standard on sports and racing cars as Weber carbs are today. This shot in the arm came from the aeronautics of the First World War, when more altitude was needed so *you* could drop a brick on that Fokker, and not the other way around.

First Miller, then Mercedes, Fiat and the Duesenbergs put this wartime know-how to work with Roots, vane and centrifugal blowers. By the middle Twenties the basics of modern valve gear and combustion chamber design were well founded, and power could now be stepped up further with the supercharger. Literally every major competition car



*One of the most famous blown sports cars of all time was the seven liter Mercedes-Benz SSKL. The blower could be cut in or out, giving 170 hp (out) and 225 when cut in. Full boost was used only intermittently – constant operation could be disastrous.*

from then until 1939 had one or more of these air pumping units.

Blowers were first discriminated against in 1938, and then only moderately in Grand Prix racing. The story was different in 1946. As I outlined in "Quart and a Half: Blown" (SCI, February, 1958) the new G.P. Formula was a setup, at that time, for boosted cars. In these fantastic 91-inch machines – the BRM V16 in particular – supercharging reached its highest state to date.

But 1946 times were not so lush for the rest of the European auto industry. Even racing sports cars had to be relatively cheap to build and run, and blowers have one inveterate sin. Whether they're helping out or not, at the time, they soak up horsepower to spin them around. This means poor economy when cruising along at small throttle openings. Even Ferrari has to sell cars to keep going, and superchargers were just not a selling point. Multiple carbs and ram tuning were also blazing some new alternate paths to power.

If a final blow was needed the present Grand Prix Formula supplied it. Forty-five supercharged inches couldn't compete with 150 unblown on alcohol, and are definitely out of the running now that gas is required. As a result of these economic and legal facts, supercharging is virtually extinct on all but three frontiers of motoring sports.

One hold-out is hot-rodding, where blowers are a welcome new tool for dragging and straightaway work. Another is international record-breaking, which inspired MG's EX181—an expression of the present state of the boosting art. The last outlaw is Free Formula racing in adventurous lands like Argentina and Australia.

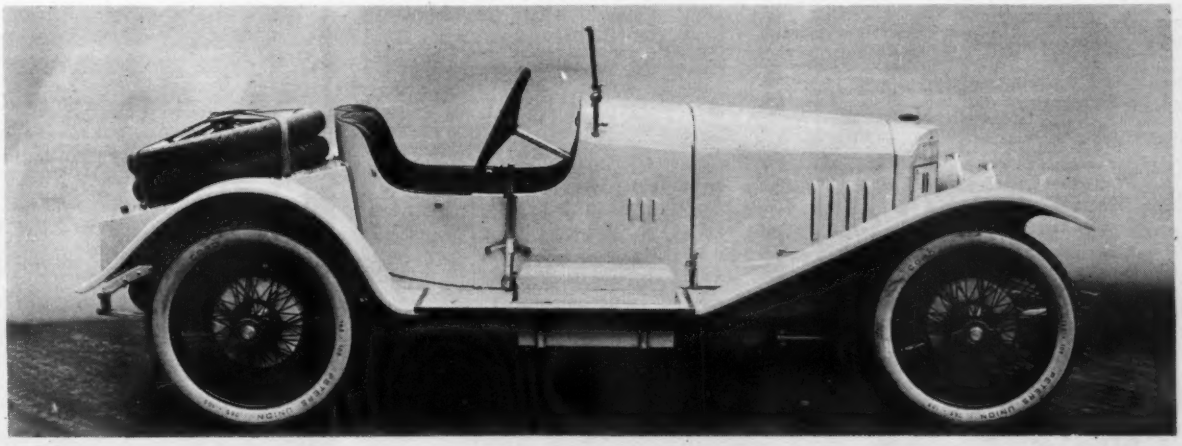
As we've seen, blowers were exiled from the sports car world for good reasons which just aren't current nowadays. For one thing, there's enough money around to support their development and use; just look at the number that are sold as kits or optional equipment. For another, ram-tuning, injection and desmodromics can only go so far. Supercharging's the only way to lift power-per-liter figures substantially above present levels. And just for good measure I think there are some remarkable opportunities awaiting the man who will join me for a look at the SCCA Modified Class rules.

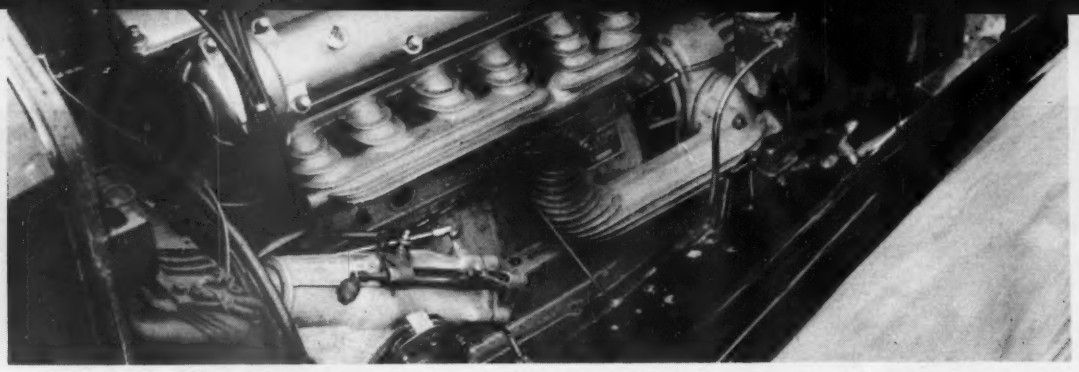
Basic to this study is the regulation that *supercharged cars will move up one class.* In Europe, this is phrased in various ways, if they bother at all. The legal displacement of blown cars is figured at from 1.4 to 2 times the "mechanical" amount.

Anyway, in the SCCA this applies a displacement handicap for each class which must be overcome by a supercharger. Let's see how much bigger, in percent, each class size is than its smaller neighbor:

| CLASS | VOLUME | INCREASE |
|---|---|---|
| A | UNLTD. | ∞% |
| B | 8.0 | 60 |
| C | 5.0 | 67 |
| D | 3.0 | 50 |
| E | 2.0 | 33 |
| F | 1.5 | 36 |
| G | 1.1 | 46 |
| H | .75 | 50 |
| I | .50 | 43 |
| J | .35 | – |

*One of the first cars to be supercharged (after Miller's race cars), the 1.5 liter Mercedes (before merger with Benz) put out a healthy 40 hp. In 1921 such power was terrific for any engine. For a 91 inch machine it was phenomenal.*





*Alfa Romeo has long been associated with blowers with perhaps the ultimate being the Type 159 GP car covered in the Feb. '58 issue. This example is the 1750 cc version. High boost pressures used by Italians create intercooling problems, hence finning.*

A quick glance shows that the smallest deficits to overcome are in blowing G Class to compete in F, and especially in boosting Class F to run against Class E. In fact, 33 percent is astonishingly small in view of the known possibilities of supercharging. Getting any ideas?

In view of the demonstrable giant-killing abilities of many of today's 91-inch sports cars, the application of pressure air could create some sure overall winners as some mean competition for the current Class E kings. With supercharging, many of the present also-rans in Class F and G could be transformed into potent threats in the next higher classes. Also practical is the sleeving or destroking of an engine to drop it one range, then supercharging to attain and surpass the previous output.

Of more interest to the manufacturers might be my conviction that blowing is the best route to an automobile that can be used for touring and racing with equal ease and success. Present techniques for stepping up the bhp of unblown engines tend to chop big chunks out of the lower end of the power curve and otherwise limit flexibility (with the exceptions of the *best* types of injection and expensive desmodromics). Properly-applied positive-displacement supercharging can hoist the horses throughout the range without maiming the engine's good manners. This, of course, depends completely on the skill with which the job is accomplished.

Now for specifics. Accepting for now the premise that the Class F engines are the best for boosting, what powerplants might respond the best? I reviewed the wide range of available engines in a Formula II rundown (SCI, February, 1957), and all except two (the Ferrari and AWE) were fours. For our purposes here this is a lamentable trend —for several reasons.

Generally, supercharging is most easily digested by an engine with a small absolute bore size. Small combustion chambers, and especially small pistons, are sturdier and easier to cool. Properly laid out, they are less prone to detonation, a limiting factor with blown engines—especially those running on gasoline as here. Intake valve sizes, while still important, are not so critical as in normally-aspirated powerplants.

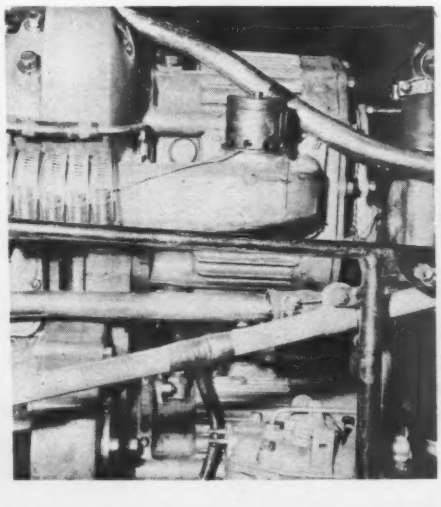
These considerations explain the popularity of straight six and eight cylinder engines as small as 1100 cc during the early Thirties, when blowing was *de rigeur*. For a return to pressure induction, today's best four-barrels are good, if chosen with an eye on the bottom end, but what this country really needs is a good six-cylinder 91-inch engine.

As a model I'd offer that AWE six or Ferrari's Formula II V6. Just for fun, and to give you an idea of the size of the job involved here, I've conjured up a blown six, quite feasible, which should make mincemeat of Class E today and leave room for development for tomorrow.

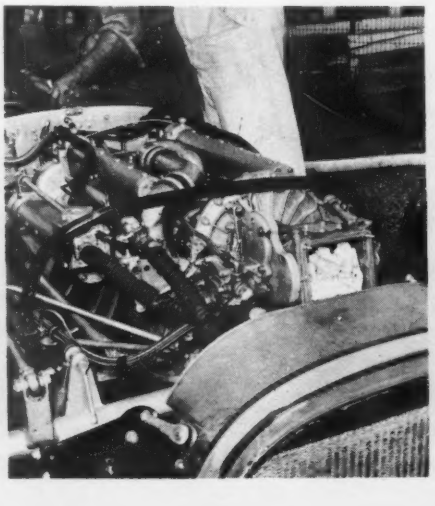
Bore is 2.65 inches, giving a neat piston and chamber size. Stroke comes out at 2.75 inches. At a corrected (divided by the square root of the stroke/bore ratio) piston speed of 3500 feet per minute the revs will be 7850, which I used as a working maximum for further calculations. Using parameters of mechanical and volumetric efficiency which are in accord with present sports car engine and blower practice, 222 bhp can be extracted by applying 18 pounds of boost. Indicated hp would come to 252, 30 horses being needed to turn the blower. Practically, with a one-to-one drive, a 120 cubic inch/revolution blower would be required.

*(Continued on page 60)*

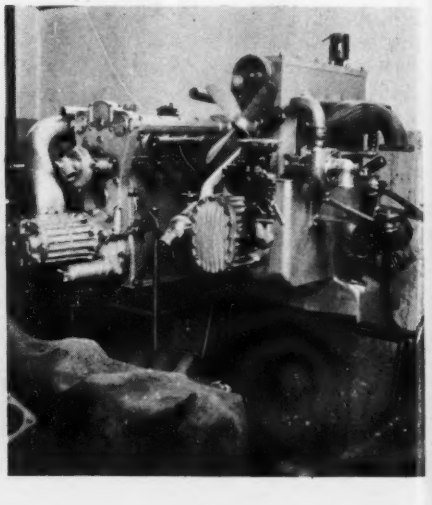
*Twin-stage Roots blowers pumping a total of 2.6 atmospheres gave 4CLT Maserati an output of 260 bhp from 91 ins at 7500 rpm.*

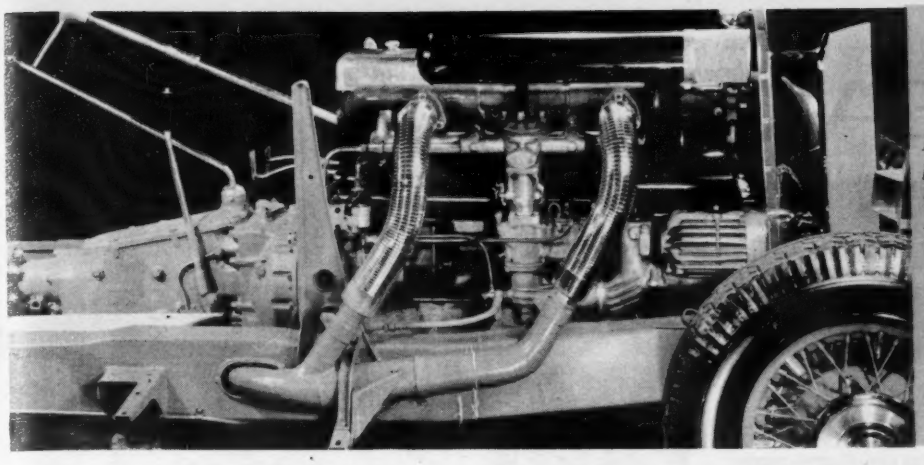


*Intercooler has been dispensed with on Novi despite fact that centrifugal unit is twisted at speeds up to 40,000 rpm!*



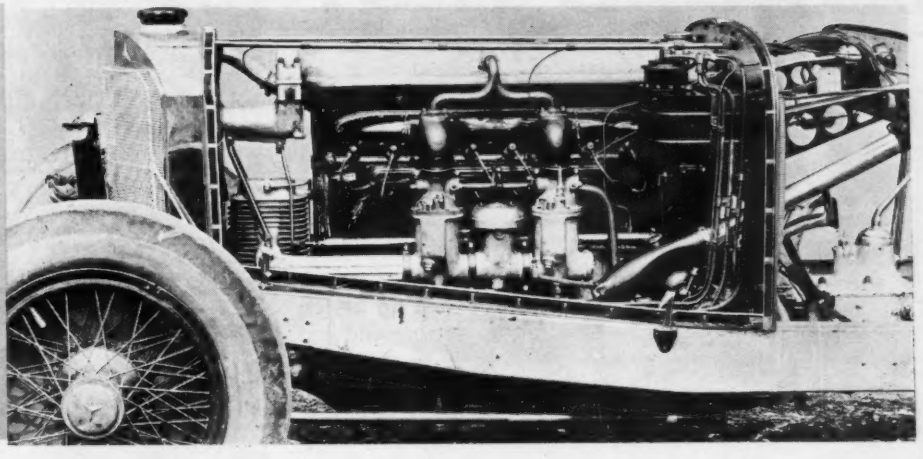
*By far the best method of driving the Roots type blower is from the nose of crank as on these two Bugatti engines.*

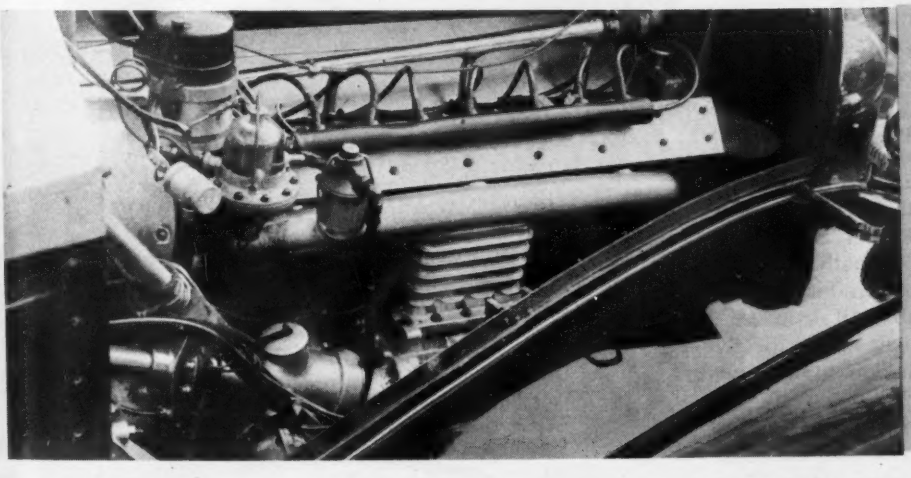




*Late pre-WWII 540 K Mercedes was fitted with the latest version of the "tromp-to-engage" Roots blower feeding through the carburetor. Big plenum chamber on air cleaner fed both blower and carb. Output was 115 hp with blower out and 180 with unit engaged, again, intermittent use.*

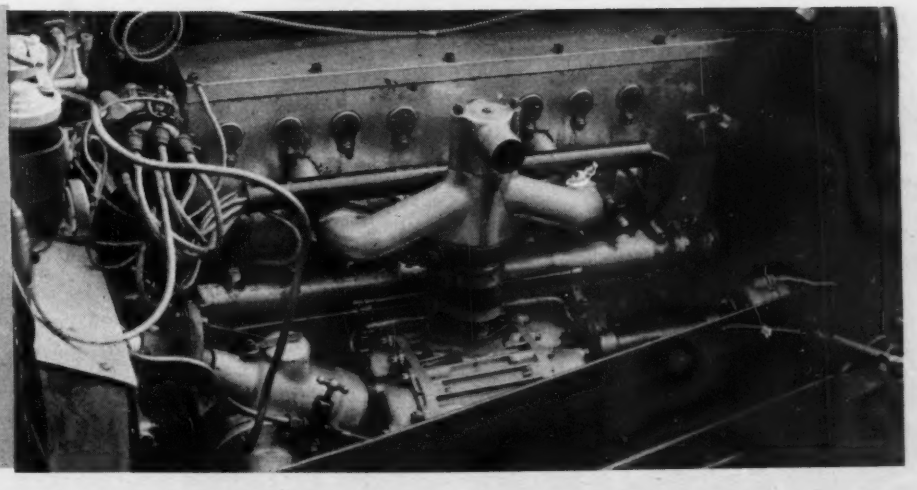
*Sporting version of the above unit was mounted on the 6.8 liter Model S Mercedes. This fed through two huge carburetors and was engaged at full throttle only. Ribbing on intake pipe helped to cool the incoming charge. All very hairy.*





*Last of the true Buggatis, the Type 57 (in several modifications) used a Roots type blower hung off to the right of the engine, driven by shaft from the accessory drive at the front. Boost was moderate — for Europe — so long intercooler was not deemed necessary. Power comes in smooth, not startling, surge, lots of noise.*

*The Type 35 Bugatti, conceded by those who know the record to be the most consistently successful race car of all time, also used shaft-driven Roots unit. With 1,851 outright victories in the three year period 1925-27 it proved the reliability of properly set up supercharging.*



# SUNBEAM RAPIER

## SCI ROAD TEST

DURING THE 1958 Geneva Automobile Show, we found the Rootes stand more crowded than expected. As a rule, the English exhibits are passed up by the general public who swarm to other more exciting and less conservative automobiles to stare admiringly at the latest Italian custom coachwork. Elbowing our way into the mass of people, we found them to be intrigued by the new Sunbeam Rapier models, now full 1½ liter machines and available either as hardtops or convertibles. Almost knocking over Brian Rootes himself in the melee, we introduced ourselves to him. He agreed that in as much as Sunbeam was leading the 1958 European Touring Championship following Peter Harper's outright win in the RAC Rally, we should have one for a road test.

Mr. Rootes told us of their plans to put a team of cars into both the Tulip Rally and the famous Alpine this summer. If Harper enjoys continued success with his Series II Rapier, there's a good chance that Sunbeam will win this year's Rally championship. The latest Rapier is designed with rally participation in mind, being virtually identical to last year's team cars. Spacious, yet compact and maneuverable, powered by the virtually unburstable "Rallymaster" 1494 cc ohv four cylinder engine, we thought the car ideally suited to represent Britain in the production touring car class.

First of all, here are the changes in the new Rapier for 1958. Most important of all are the engine modifications that have produced a 9% increase in maximum output. The bore is out to 79.0 mm from 76.2 mm, raising the displacement 104 cc. Maximum brake horsepower is now listed at 73 bhp at 5200 rpm, while the torque curve has also been improved, producing 81 lbs-ft at 3000 rpm. Compression ratio, formerly 8.0 to 1, is now 8.5:1. Inlet and exhaust valves have been made slightly larger, while at the bottom end, lead-indium bearings are now used. With the hood up, one notices a thick silencer pad lining the hood. A second muffler is fitted directly behind the engine to further reduce the noise level. From the wheel, the Rapier appears almost the same as last year's car. But externally, rather extensive changes have been made. A vertical grill, reminiscent of earlier Sunbeams, graces the front, while at the rear, Rootes have gone American with a conservatively rakish pair of tail fins. Vision is good from the driver's seat, the fins serving as excellent guides for placing the car accurately while reversing. But the two best changes on the Series II Rapier are in the brakes and the shift linkage.

*New grille revives traditional upright motif, while hooded headlights and angled fins are aimed straight at US market.*

First the brakes. The car sports drums 10 inches in diameter at the front and 9 inches at the rear, giving a sizeable improvement in overall braking area. In our brake test we had hardly the slightest trace of brake fade during the ten 60 mph to zero panic stops. The pedal became hard and the brakes were beginning to smell at the conclusion of the test, but they were still just as potent at the end as they were at the beginning. Aside from these very fine anchors, Rootes has finally gotten around to fitting the Sunbeam with a floor shift. We found the new gear change to be simple, sturdy and very direct. It was too easy, however, to flick the lever into the reverse gate when coming down fast from third to second. A foolproof lock should be designed at once for this fine new system.

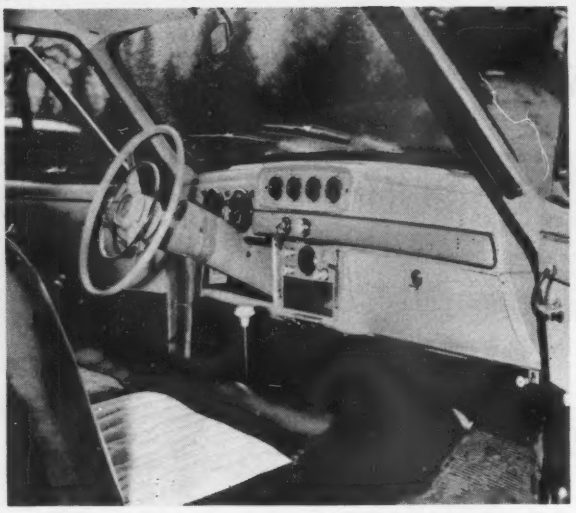
Eager to try the car on the road, we headed our Rapier out of Switzerland and into Germany where SCI has laid out a road test circuit that includes a stretch of Autobahn near Munich as well as some secondary roads that put any car on the defensive. German secondary roads are pretty bad, especially in the early Spring when faulty drainage has produced frantic ruptures from thawing. Whole sections of road are torn up and dodging man-sized chuck holes keeps a driver more than just a little busy if he's intent on making time.

The Rapier sailed over the rough stuff in fine shape, though on one or two bad washboard surfaces the whole car shook a bit violently, but we plowed on as fast as we could, beating the car unmercifully to find out just how it would stand up. A few minor rattles did show themselves after an hour of steady pounding, but we were able to get to Munich on time and well within our scheduled average. On the Autobahn, the overdrive-equipped Rapier is entirely at home. Controlled by a switch on the steering column, the Laycock-de-Normanville is operative in third and fourth gears only. Closely grouped, these four different ratios are all that are necessary either for effortless cruising on the open road or for zipping through fast moving city traffic.

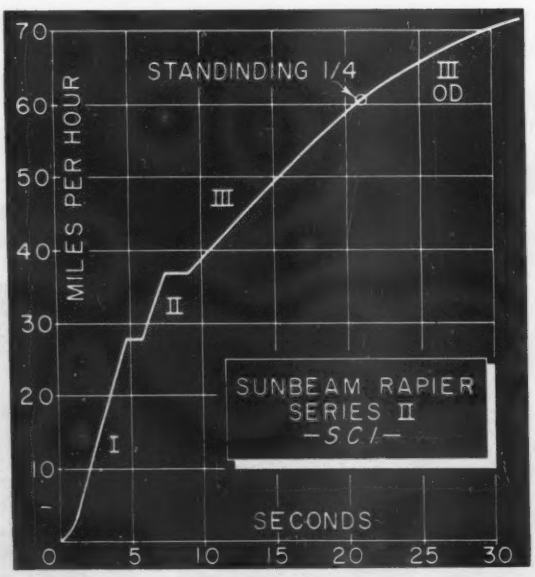
Though the rear axle ratio has been dropped from 5.22 to 4.78, the gearbox is unchanged. So is our major criticism. First and second are too low and too close, and second and third are too far apart. Now that the Laycock-de-Norman ville overdrive, an optional extra at $159, is restricted to third and fourth, the last point becomes especially annoying. As Rootes has chosen to entitle the gears Emergency Low and One, Two and Three, it seems apparent that the Rapier

*Burman steering box gives healthy improvement over last year's Rapier, especially in tight turns. European Ed. shows off its understeer in wet.*

*Speedometer and tachometer are right ahead of driver; minor instruments and heater controls are at center of "crash-padded" dashboard.*



*Above, all that remains of "backwards" column shift is a button above steering column showing new shift pattern. Engine, below, looks unchanged on the surface, but boring it out 0.11 inch raised power and torque output by 9 per cent.*




## SUNBEAM RAPIER SERIES II "COUPE DE SPORT"

**Price at East Coast and Gulf POEs—$2499 basic, $2705 as tested**
**Price at West Coast POEs—$2589 basic, $2784 as tested**

### PERFORMANCE

**TOP SPEED:**

| | |
|---|---|
| Two-way average | 86 mph |
| Fastest one-way run | 87 mph |

**ACCELERATION:**

| From zero to | seconds |
|---|---|
| 30 mph | 6.1 |
| 40 mph | 10.6 |
| 50 mph | 15.2 |
| 60 mph | 20.6 |
| 70 mph | 29.3 |
| 80 mph | 47.9 |
| Standing ¼ mile | 22.0 |
| Speed at end of quarter | 62 mph |

**SPEED RANGES IN GEARS:**
(6000 rpm max)

| | |
|---|---|
| I | 0-25 mph |
| II | 0-37 mph |
| III | 15-61 mph (20-80 in OD) |
| IV | 22-top (27-top in OD) |

**SPEEDOMETER CORRECTION:**

| Indicated | Timed |
|---|---|
| 30 | 29 |
| 40 | 37 |
| 50 | 46 |
| 60 | 56 |
| 70 | 65 |
| 80 | 75 |

**FUEL CONSUMPTION:**

| | |
|---|---|
| Hard driving | 20 mpg |
| Average driving (Under 60 mph) | 26 to 30 mpg |

**BRAKING EFFICIENCY:**
(10 successive emergency stops from 60 mph, just short of locking wheels)

| | | | |
|---|---|---|---|
| 1st stop | .64 | 6th | .64 |
| 2nd | .64 | 7th | .64 |
| 3rd | .64 | 8th | .64 |
| 4th | .64 | 9th | .64 |
| 5th | .63 | 10th | .64 |

### SPECIFICATIONS

**POWER UNIT:**

| | |
|---|---|
| Type | In-line four, water cooled |
| Valve Arrangement | Pushrod overhead valves, in line |
| Bore & Stroke | 3.11 x 3.00 in (79.0 x 76.2 mm) |
| Stroke/Bore Ratio | 0.96/1 |
| Displacement | 91.2 cu in (149 cc) |
| Compression Ratio | 8.5/1 |
| Carburetion by | Two downdraft Zenith 36 W1P 2 |
| Max. Power | 73 bhp @ 5200 rpm |
| Max. Torque | 81 lbs-ft @ 3000 rpm |
| Idle Speed | 600 rpm |

**DRIVE TRAIN:**
Transmission ratios test car

| | |
|---|---|
| I | 3.19 |
| II | 2.47 |
| III | 1.49 (1.13 in OD) |
| IV | 1.00 (0.76 in OD) |
| Final drive ratio | 4.78 (3.62 in OD, 4.55 without OD) |
| Axle torque taken by | Rear springs |

**CHASSIS:**

| | |
|---|---|
| Frame | Pressed steel |
| Wheelbase | 96 in |
| Tread, front and rear | 49, 48½ in |
| Front Suspension | Coil springs, unequal wishbones, anti-roll bar |
| Rear Suspension | Rigid rear axle, semi-elliptic springs |
| Shock absorbers | Telescopic |
| Steering type | Burman recirculating ball |
| Steering wheel turns L to L. | 3¾ |
| Turning diam., curb to curb | 34¼ ft |
| Brakes | Lockheed two leading shoe |
| Brake lining area | 146 sq in |
| Tire size | 5.60 x 15 |

**GENERAL:**

| | |
|---|---|
| Length | 162½ in |
| Width | 60¾ in |
| Height | 56 in |
| Weight, as tested | 2440 lbs |
| Weight distribution, F/R as tested | 55/45 |
| Fuel capacity | 11.8 U.S. Gallons |

**RATING FACTORS:**

| | |
|---|---|
| Specific Power Output | 0.80 bhp/cu in |
| Power to Weight Ratio | 33.4 lbs/hp |
| Piston speed @ 60 mph | 1980 ft/min |
| Braking Area | 120 sq in/ton |
| Speed @ 1000 rpm in top gear | 15.2 mph |


# *The 190 SL:* EXCELLENCE ON ROAD AND RALLY

The Mercedes-Benz 190 SL was designed fundamentally for driver and passenger pleasure. As a sports car, it is a high performance machine with particular emphasis placed on road characteristics. Four-wheel independent suspension utilizing a low pivot point, single-joint rear swing axle, large transverse cooling fins on the brake drums, and extremely precise recirculating ball steering with a pitman arm of tremendous strength, combine to endow the 190 SL with surprising potency on tortuous roads.

What else does the 190 SL offer? You will agree that you can virtually count the number of marques in the world, on your fingers, that provide workmanship of this calibre and, for a sports car, appointments of this degree of luxury. Taut leather, roll-up windows, a weather-proof top and faultless fittings are a pleasure in themselves. However, when you get them in a car that is both tractable, yet can be safely driven near the limit of adhesion, you have fun to the *nth* degree. And that's what the Mercedes-Benz 190 SL is for.

*Mercedes-Benz motor cars are distributed exclusively in the U.S. by the Studebaker-Packard Corporation and sold and serviced through selected dealers franchised by Studebaker-Packard.*

Studebaker-Packard
CORPORATION

## RAPIER

*(Continued from page 44)*

is intended primarily as a docile family sedan. Its competitive successes stem from the fact that as such, it is indeed better than average in road-holding, breaking and in accelerative ability. Just the thing for families and rallies, in fact.

In order to get off the line smartly in our acceleration runs, we did use this Emergency Low, winding the engine to the far side of the 5500-6000 rpm red band and shifting at 28 miles per hour to second (One). Thirty-seven came up quickly and a snappy upshift put us in third. The speedo needle rapidly climbed to 65 (an actual 61) and with a flick of the switch, revs dropped one-fourth as the overdrive engaged smoothly and quickly under full throttle. The next shift came at 80 as we switched the OD off and simultaneously changed to fourth.

Top speed runs were made over SCI's measured quarter mile on the Munich-Ingolstadt autobahn in fourth OD. The speedo easily found the 90 peg and then began to falter, registering a hair over 90 on two runs. This worked out to be a true 87 mph. Considering the fact that this particular Rapier had been used harshly at Geneva as a demonstrator and then handed over to us, we were not disappointed in its inability to clock an honest 90 mph. Actually, considering the car's weight and streamlining handicap, we felt the Rapier's on-the-spot performance quite creditable. Engine speed in fourth overdrive was a modest 4200. It's worth noting that noise inside the passenger compartment was far from objectionable while flat out.

Steering we found to be still on the heavy side, despite the new Burman recirculating ball unit. The car understeered considerably when thrown into a corner hard, but it doesn't wallow at all, feeling very safe and secure. The Rapier did not like being slid on rough roads, but on smooth-surfaced pavement we could easily provoke rear end breakaway, though the tire screech seemed to be out of proportion.

Comfortable seating for four is fully possible in the Rapier. The two front seats fold forward well out of the way to allow easy access to the rear. Leg room in the front is more than adequate while knee room in back is enough even when both front seats are all the way back. Driving position is good and the pedals large and well spaced. A huge headlight dimmer switch could never be missed in the dark, nor could the well-placed two-speed windshield wiper control. Tach and speedo reside directly in front of the wheel, while the four other instruments are laid out in a row in the middle of the dash. The whole interior of the car is done in a washable bright colored imitation leather which gives off a warm, sort of light-hearted atmosphere well in keeping with the Rapier's personality.

We were particularly impressed with the size of the luggage compartment, though the trunk lid catch proved to be difficult. Overall quality of workmanship on the Rapier was not bad, though certain items on the dash did not seem to be up to previous Sunbeam standards. Storage compartments are multitudinous, but we still missed map pockets in either door. Optional at $57 more, the heater and defroster worked well, and in a heavy rain storm encountered in Germany, the car was 100% water tight.

Featuring a bit of a dual character, it looks as if its successes in the rallying game will provide the necessary spark to stimulate sales success in the market place, where it will sell primarily as a family car.

*Jesse Alexander*

## AUTO UNION

*(Continued from page 27)*

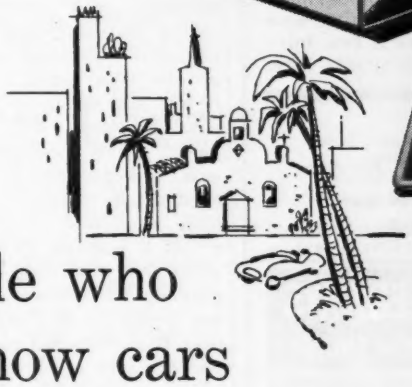
than today's Formula 1 cars, would turn everything but handsprings at his bidding. Zwickau being conveniently near to Nürburgring, Auto Union often used to hire the circuit for test purposes. During these sessions they had the exclusive entre to the place, and the *in camera* atmosphere seemed to dispel the last of Bernd's few inhibitions. The pit area at the Ring is perhaps 75 feet wide. One time just because he happened to feel like it, Rosemeyer demonstrated a novel form of take-off from the pits. When the operator with the portable electric starter had fired up the engine and stood his distance, Bernd dropped in the clutch and pitched into a series of overlapping circles, on full correcting lock and with rubber smoke spouting from the back tires. The pattern of arabesques carried the bolide clear across the road, finally to within inches of the wall fronting the tribunes; there, at the critical split second, and without otherwise punctuating his waltz, Rosemeyer unwound the steering a degree or two and shot off along the course.

Not long ago, in an article in an American magazine, it was said of the Auto Union that "nobody ever learned how to take it into or out of a corner really fast". This was nonsense, and justifiably riled survivors of the *equipe* who read it. To get nearer the truth, let's say that out of the men who drove Auto Unions, Rosemeyer, Nuvolari and Stuck learned to corner them really fast. The relative misfits, some of whom, however, showed a sporadic insight, were Muller, Hasse, von Delius (killed in collision with Seaman's Merc during the 1937 German GP), Prinz zu Leiningen, Momberger, Meier, Bigalke, Fagioli, Kautz, Pietsch.

Almost consistently, anyway according to published and widely accepted figures, the Mercs were up on power compared with the Auto Unions of corresponding date. So how came it, if nobody knew how to take an Auto Union through turns really fast, that over the six relevant seasons, the Zwickau marque copped 41% of the top *grandes epreuves*? How too, it is pertinent to ask, did Auto Union ever succeed in licking the Stuttgart metal at Nürburgring, which is practically all corners? Rosemeyer lived to contest three German Grands Prix at the Ring, and won

**(Continued on page 48)**

# From London to Los Angeles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## AUTO UNION

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one of them. Stuck took another and was second twice. Out of three bids in the Eifelrennen, run over the same dizzily virageous circuit, Rosemeyer scored two wins and a second place.

And it wasn't only on relatively slow pitches with a plethora of tightish turns that AU effectively held a candle to the Mercs. On the world's fastest road circuit, the fantastic Mellaha course in North Africa, Achille Varzi average 129.01 mph over 500 kilometers to win the Tripoli Grand Prix in 1936, beating the race record by a hair under 6 miles an hour. Previous holder was Rudolf Caracciola on Mercedes-Benz (and, to be fair, another Merc driver, Hermann Lang, retook the record the following year at 134.25, where it still stands).

As sometimes happens with the glamor boys of dangerous sports, Rosemeyer was spuriously credited—until he broke his neck—with living a charmed life. The race that contributed most to this fable was the unforgettable Eifelrennen of 1936. Visibility during the first half was almost normal; then a stealthy mist, thickening to fog, started sowing the Nürburgring's mountain switchback with deathtraps. To anyone who hoped to make old bones, it was the signal to sit up and take it easy. Everybody did, too, except Rosemeyer. With apparently insane recklessness, he kept right on at almost unslackened speed, finally winning from Caracciola (Mercedes) by the unheard-of margin of 2 minutes 13 seconds—in a race going less than half of full grand prix distance. His overall average, 72.76 mph, was a fraction of a mile per hour slower than Caracciola had made in winning the previous year in normal visibility.

This uncanny *blinkskreig*, which earned Bernd the unofficial title of *nebelmeister* (fogmaster), in fact had a rational explanation. He went that fast because he alone could see where he was going. Elly Beinhorn, the German girl air ace of the 30s who became Rosemeyer's wife and widow by turns, confessed to friends she was scared spitless the first few times she rode with him in fog. "What's worrying you?", he used to say—"I'm not going to *hit* the damned horse and cart". As she later told it: "Me—I hadn't even *seen* a horse and cart when he spoke, but it showed through eventually all right".

The phenomenal speed of Rosemeyer's reactions, and his way of brushing adversity aside, is illustrated by the following story (gleaned from Prof. Eberan and hitherto unpublished) of events leading to his win in the Coppa Acerbo as Pescara in 1936. Spinning out on a fast turn while well in the lead, he found himself headed inescapably for a telegraph stanchion of the peculiar type they have in this Adriatic region. These structures consist of two poles, each about ten inches in diameter, set to form an inverted V. Figuring that if he couldn't steer around the thing he'd better go through it, Bernd did just that. The crotch was, as luck would have it, approximately one Auto Union wide, or to be exact, fractionally less, as was proved by the gashes the car slashed with its hubcaps on the inner radii of

both poles. The impact split the right-hand hubcap and it fell off within a mile or two, unnoticed by the driver, who hadn't stopped. Then, on one of a series of downhill hairpins, the wheel came off too. Pescara was and is the longest road circuit in Europe, and Auto Union had taken the precaution of setting up a subsidiary base out on the back leg. Maintaining precarious balance on three wheels and one brake drum, Rosemeyer made it to this depot, several tortuous miles distant, had a new wheel fitted and went on to win.

Bernd hadn't much mechanical knowledge and he lacked the gift for expressing what little he did have. Mostly, his responses to technical interrogations alternated between "It's terrible" and "It's fine, don't alter a thing". Rudolf Hasse was about the only regular Auto Unionist capable of an articulate diagnosis. But in any case, the Zwickau engineers took the attitude that the less a driver knew the better, within limits. They had their own methods of fact finding, more scientific ones, too, than trying to unscramble and make sense of the handlers' conflicting opinions. There was, for instance, "Isador."

This ingenious robot, designed by Eberan and made by Kienzle, the well-known German instrument specialist, was a multi-purpose recorder that could tell you practically anything you needed to know about the way a car had been driven. Just to remind the driver he needn't bother to indulge in any romantic fancies during a subsequent conference, "Isador" stared him right in the face as he sat in the cockpit: but without the key, of which Eberan kept close custody, there wasn't a thing a driver could do to suborn the silent witness. Its primary graph plotted speed in relation to elapsed time, and from this, using their knowledge of which ever circuit had been traversed, the technicians could determine each team member's speed at any given point on the course. A secondary telltale showed when (and thus, by simple deduction, where) each gearshift had been made. Yet another subrecorder kept account of all brake applications and ledgered the exact pedal movements traversed. The drivers did not love "Isador." They had christened him themselves and it wasn't an affectionate nickname.

Auto Union tests with the ZF limited-slip differential pointed up the futility of depending too much on drivers' assessments of mechanical phenomena. After noticing how the boys frequently contradicted not only each other but also themselves on the effectiveness or otherwise of this device, Prof. Eberan tried the experiment of running trials with the ZF implaced but having it understood it wasn't, then vice versa. From these homely subterfuges the fact emerged that the drivers mostly couldn't tell the difference between one state and the other, although they might previously have cast impassioned votes either *pro* or *con*.

Among Auto Union's several minor disabilities, *vis-à-vis* Mercedes, was their lack of a top technician with the qualifications for handling a 500 horsepower bantamweight at race speeds. The Stuttgart camp, of course, had Rudolf Uhlenhaut. Eberan sometimes drove Auto Unions at considerably less than full race speeds, but he'd

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# AUTO UNION

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broken his neck once (in a monoposto Alfa) and his employers were anxious he shouldn't break it again. Incidentally, it's still broken, so while he never has any trouble seeing where he's going, it is difficult for him to see where he's been.

Whether or not it is conceded that the most powerful Mercedes engines of the 30's surpassed Auto Union's bhp figures — more of this later — the latter undoubtedly took the palm for torque. For instance, the 6 litre C-type engine developed a staggering 647 pounds-feet at 2500 rpm. This figure was slightly exceeded by the subsequent 6.33 litre R-type movement, but the exact twist on this one's crank is hard to ascertain. In general, detailed technical information on the Auto Unions is sparser than Mercedes data, due to the fact that Zwickau is of course in the Soviet Zone of Germany; all trace of Dr. Porsche's masterpieces and their 3 litre successors was lost when the war finished. Auto Union now a union in name only, with DKW as their sole badge, are currently established at Dusseldorf, in the Western Zone, and they do have on display the empty shell of one prewar grand prix engine; it looks complete to the naked eye if you don't get too close, but all the mechanical anatomical bits that matter are missing. Prof. Eberan, who escaped from east to west in 1945, came out with just the clothes he stood up in, and perforcedly jettisoned every last folio of his personal records on the turnabout tornadoes.

Rosemeyer was the only driver who ever learned to make full use of the dumbfounding torque of the 16-cylinder cars. On any section of any given circuit, with the exception of long straightaways where top gear would be the obvious ratio for anybody, he always went one gear higher than the rest. This way he wasted less fuel and tire rubber than the others, as well as making the best use of the available acceleration.

Just how electrifying Auto Union acceleration was, in spite of the handicap imposed by almost equal distribution of weight between front and rear axles, is shown by these world and international Class B records, that posthumously stood to Bernd Rosemeyer's credit until this year: Standing kilometer, 117.3 mph; standing mile, 138.7 mph. These marks were set with 6 litre cars (two of them) on the Frankfurt Darmstadt autobahn in October of 1937. They used two cars for the job because Eberan had calculated in advance that the slightly heavier streamliner would be faster than the monoposto over the greater distance, but vice versa over the shorter. Tests proved this was so.

Incidentally, although Mercedes beat Auto Union's total score in the grands prix, the Zwickau firm still holds world records, but Mercedes doesn't.

The first time Rosemeyer had attacked the standing start records, in '36, he raised them by the incredible margin of 44 mph, dispossessing a straight-eight Panhard which, with 8 litres under the hood, was closely crowding the class B limit. The Auto Union, of course, was giving away more than 2 litres in class B.

Auto Union never went for a record until they knew with absolute certainty they could take it. During their prepping for the 1937 assault on the short standing marks, they secured the closure of another section of autobahn, near Leipzig, and, by their own unofficial but hyperaccurate electric timing, frazzled the existing figures *seventy-four times*. The 6 litre car was capable of spinning wheels up to 100 mph on dry roads and to 175 mph on slightly wet ones.

Considering how rigidly and rationally motor sport was controlled in Germany during the Nazi regime, it is curious to reflect that a senseless official decision was indirectly responsible for Rosemeyer's death. The story goes like this:—

Late in 1937, during a Records Week, Rosemeyer drove the current 6 litre streamliner over the flying mile and kilometer at 252.5 mph, fastest ever in Class B. Shortly afterwards, Mercedes approached General Hunlein, Hitler's boss of motor sport, for permission to try to lick these figures. At first the sanction was refused (reasonably enough, on the principle there was no sense in the two camps cutting each others' throats). On being further pressed, however, the general relented. Auto Union thereupon asked permission to prepare a car to try to regain their prize if Mercedes should succeed in taking it from them. This was pretty well unanswerable, and Hunlein gave the nod.

Both equipes therefore assembled on the chosen stretch of the Frankfurt-Darmstadt autobahn on the same day. Caracciola made his runs and duly beat the AU paces, registering 268-odd for the mile and kilometer both. Then Rosemeyer took his turn. On his outbound run he was faster than Caracciola. Homing, he ran out of control, was pitched out of the beserk car and thrown into the trees flanking the course. There wasn't a mark on him, but his neck was broken.

There were slightly macabre repercussions to this unhappy episode. A photograph somebody took of Rosemeyer at speed appeared to show that wind pressure had driven a hairy big dent in the cowling, somewhere above and behind the right-hand front wheel. If this had indeed happened it would have been a very grave reflection on those responsible for the development and preparation of the car. In fact, a rumor went around that Prof. Eberan was to be arrested at Bernd's funeral.

Eberan knew the skin couldn't have concaved under wind pressure but it looked as though he might have a hard time proving it. He couldn't, of course, re-photograph the original body from the same angle because it had been smashed beyond redemption. What he did, therefore, was to have an exact replica built and rigged on a duplicate chassis. Then the photographers got busy. The first trial shots missed the crucial angle by a few degrees, and revealed nothing. But subsequent like-

nesses, all taken from slightly different aspects, did begin to show the phantom dent. Finally they hit precisely the right angle, and there, plain as day, was the mirage again . . . a nonexistent irregular depression covering perhaps three square feet of the surface.

Well, that put the technicians in the clear, but it didn't bring Rosemeyer back. If Hunlein's department hadn't acquiesced to Mercs' let's-have-a-go plea the boy need never have died. As a matter of fact, his superiors, keen as they were to win back their lost records, tried to dissuade him from attacking, on the ground that awkward wind gusts had started up. But Auto Union was, oddly enough, a fairly democratic outfit in many ways: people weren't just ordered to do things necessarily or to refrain from doing them. Quite often they were merely asked. To Rosemeyer, unfortunately, danger was a favorite challenge.

The genesis and broad development of the rear-engine Auto Union is an oft-told tale, for which the exacting student will be well advised to turn to Laurence Pomeroy's classic, *The Grand Prix Car*. There isn't room here to relate it in detail, though the outline must be sketched in.

It started with an oddball that Dr. Ferdinand Porsche, who had recently gone freelance after a long term on the Daimler-Benz payroll, designed as a speculation in 1933. This car, which he provisionally called the P-Wagen, had a 45° V-16 engine just ahead of the rear axle plane, a five-speed gearbox behind the rear axle, and a very large fuel tank between the engine and the forward placed cockpit. The chassis was a simple structure of large bore parallel tubes and all wheels were independently suspended, the back pair having swing axles and a transverse leaf spring, the front pair double trailing arms and lateral torsion bars. The existence of the P-Wagen came to the notice of the Auto Union directorate at about the time the German government announced the $200,000 grand prix lure mentioned earlier. They dissected the design, liked it, bought it. With it they also bought the services of Dr. Porsche.

The original P-Wagen, with minor modifications, became the A-type Auto Union, and was launched into racing and records in 1934. During this season, variously bodied to suit its various tasks, it raised the world's hour record (among others) to 134.6 mph on the Avus track, almost unbanked as it then was; and won the grands prix of Germany, Switzerland and Czechoslovakia — one less than the new forward engined Mercedes, which scored in the Eifelrennen, Coppa Acerbo and grands prix of Italy and Spain.

Displacement of the A-type was 4360 cc, and with moderate boost from a big Roots blower mounted vertically at the back of the block, it developed 295 bhp at 4500 rpm. Its valve gear was unique and, by Michaelangelo's criterion of beauty —"the purgation of the superfluous"— beautiful as well. From a single central camshaft the inlet valves were operated through short levers and the exhausts by almost horizontal pushrods. Wet liners inserted into a silicon alloy block formed

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## SIMCA

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Simcas are basically trackers, because it is difficult to induce the rear to slide out. But despite the lack of dramatics, you'll find that there are very few corners or turns that can not be taken at cruising speed. As a sort of rule of thumb, we settled on double the posted turning speeds over a section of highway that will go unidentified. When the sign said "Slow, Turn, 25 mph"; we took it at fitfy. We had no anxious moments, felt perfectly secure, and attracted absolutely no attention. As we said before, the Simca looks harmless. If you're the kind of person who'd be willing to sit home and get his tickets by mail just to build a reputation, don't buy a Simca. This one is for the person who tracks dust, but who spends his money on wines instead of fines.

In appearance, the Simca is French, in the same way that Paris is French. It's a car that breeds nostalgia for that particular Paris-taxi beep-beep kind of feeling that permeates the City of Light.

The interior of our test car was finished in green-on-green upholstery, with reinforcement covering the points of heavy wear. Both seats are to be sat in by well-proportioned adults over a long distance, comfortably and luxuriously. The appearance of the car is by no means representative of the nominal purchase price and low operating costs.

In order to verify exact fuel consumption over operating conditions, we took an average from eight-hundred miles of hard driving. This consisted of New York City traffic, high-speed running over open and semi-congested, low-gear roads, and acceleration and performance testing. We did our best to get the worst possible mileage that anyone could get, short of running deliberately in low gear. We averaged 24.5 mpg. Without trying too hard, it should be as easy to get 30 mpg from a Simca as it is to get a speeding ticket in Connecticut in a Lotus.

One of the standard features with the Montlhery is the adjustable-rake seats, which twice, in the course of two days, we found occasion to put to welcome use. The first time was on a Saturday, about noon, when after having skied for a few hours under Spring sun in a T-shirt (no, not *just* a T-shirt) we stopped for lunch. Strong sun and warm food, lethargy, seats stretched full back, and an hour's cat-nap before resuming the sport. Again, Sunday night, and many bruises later with a few hundred more miles to go, driver and co-driver alternated driving and sleeping. As a tribute to Simca roadability, at one point the writer opened one eye to see the speed needle glued to the seventy-five peg, but he just went back to sleep.

To get down to a few particualrs, the engine is very responsive and capable, and the Solex carb is equipped with an automatic choke that impressed us. To start the engine, always keep the foot off the throttle; the choke auomatically supplies the correct openings. We tried it in 60° New York weather and below-freezing Vermont weather, with both hot and cold engine, and it worked every time. The

clutch is as soft as any we've ever tried; yet no matter how rapidly we changed gears or how far off we went on our engine-speed/wheel-speed synchro, as soon as the clutch was popped, it took a solid bite. And we soon learned our way around the gear box.

The shifting lever that controls the four-speed (top three synchro) gearbox is located on the steering post. The pattern is the standard "H" with first gear occupying the slot Detroit reserves for reverse. Reverse is engaged by pushing the lever toward the instrument panel, then down. Shifting is very smooth, but it is difficult to go from one leg of the "H" to the other until you have practiced it a while. And familiarity proves that the quickest way to shift is to be deliberate: taking our time, we shifted from second to third, and third to second, in four-tenths seconds.

The steering is quick, but not so quick as to be scary. Comfortably quick is a better phrase; you can corner without cranking, but if you go a little too far you can back off easily without twisting the car. It feels solid, has no play, and has just about the right amount of return. And road shocks do not give your self-winding wrist watch a hard time.

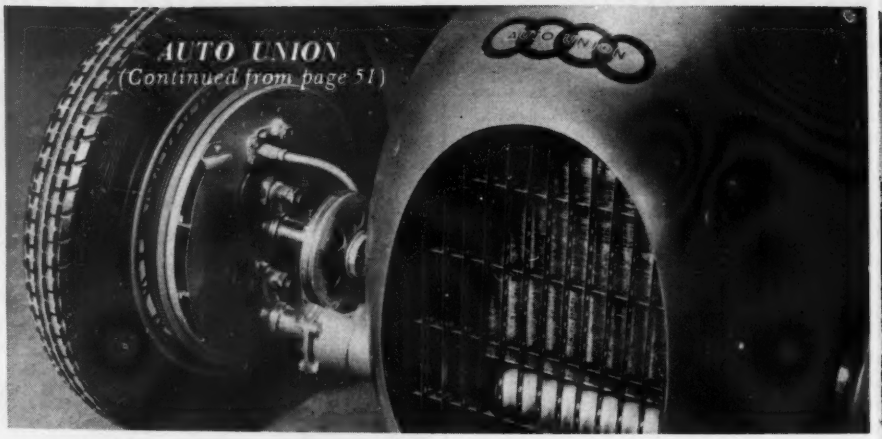
The brakes were subjected to ten successive emergency stops from sixty mph in 40° night air. On each stop, we registered better than 2/3 g, but from the fifth stop to the tenth, it became necessary to apply more pedal pressure. After the eighth stop, the linings began to smell noticeably as the car eased to the left. After the tenth stop was completed, the pedal was just about to the floor, but the decelerometer gave uniform readings for all ten stops.

The car accelerates quite rapidly, going up to sixty a lot quicker than you have a right to expect from 79 inches pushing a sedan, and then sustains a healthy deceleration rate. Though the brake pedal gradually disappears from underneath the foot, recovery is complete, and it is doubtful, in the same way that it's doubtful a VW will ever take first overall at LeMans, that anyone would ever need more stopping power from a four-door sedan for road use.

The co-driver did take exception to the location of the front pillars, as at times they interfered with peripheral vision; however it was a unilateral gripe. The writer found a defective defroster unit more irritating than anything else — four hundred miles through snow and rain with the defroster sweeping the entire windshield with the exception of the section immediately before the driver's eyes. If a ski goggle demisting cloth hadn't been readily available, there might have been more to say about defrosters that don't operate properly. Other than this minor goof, the quality of the workmanship was excellent.

The car is sturdy and compact; it is a car that is small on the outside and big on the inside. On the road, it feels solid; you get the impression that you are part of the car, which in turn is part of the road. Simcas are a lot more than basic transportation, and in terms of appearance and performance, the only way you can tell it's an economy car is to take a look at the price tag.

*Len Griffing*



## AUTO UNION

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*ABOVE: '36 V-16; rings represent Horch, Audi, Wanderer and surviving DKW. RIGHT: Head mechanic, responsible for car, fits featherweight tail section to V-16.*

the cylinders. The heads were detachable, each one containing two valves per cylinder forming an included angle of 90°. The parent P-Wagen engine had a one piece crank with plain journals and big ends, but this was early replaced by a built up Hirth shaft with roller big ends. The radiator was carried in the normal position at the front of the car, and as a weight saving dodge the early examples used the tubular frame members as water circulatory passages. This arrangement proved leak prone, though, and was soon ditched.

The fewness and simplicity of the modifications to the original concept that proved necessary during the life of the 750 kilogram formula are their own testimony to Porsche's remarkable foresight. So far as the running gear was concerned, they amounted to little more than the substitution of longitudinal torsion bars for the lateral leaf spring at the back, and revisions to the shock absorbers. In the engine department, a three-stage growth in swept volume was achieved without altering the original cylinder centers. The first of these increases marked the A to B transition, brought the capacity to 4950 cc (1935), and the power to 340 bhp at 4700 rpm. The C-type successor, operative during 1936/37, displaced 6000 cc, developed 520 horse at 5000 per minute. Finally there was the 6330 cc R-type, prepared only for records, which gave 545 bhp at 5000.

Datewise, the R overlapped the 3 litre D type race and records car. This one, as recalled earlier, placed the driver farther back, a shift made possible by two things. One was a reduction in engine length resulting from the decreased capacity and the use of twelve instead of sixteen cylinders; the second was the employment of dual pontoon tanks in place of a single tank between the engine and the cockpit. The 3 litre engine had two banks of six cylinders each, making the wider angle of 60°, and three camshafts, one in the center serving all inlets and two individual exhaust shafts out on the shoulders of the vee. With two-stage supercharging by Roots blowers, the V-12 developed 500 horsepower at 7000 per minute. Maximum speed in road race trim was around 205 mph, approximately five per hour slower than the corresponding V-16. Wheelbase of the A, B and D type cars was 110 inches and their treads 55 inches, compared with 114.5 inches of wheelbase and a 56 inch tread for the C and R models.

The fastest Auto Union ever built was of course the 6330 cc R-type in record breaking dress. Rosemeyer's was hitting over 270 when he went into his last waltz.

There were two facets of Auto Union's race and record achievements on which they rightly prided themselves: they made relatively little money go a long way and they consistently hit a very high standard of reliability. Partly, of course, they were economical because they had to be, but this doesn't really affect the point. In a multitude of design details, Zwickau resorted to simple, almost spartan expedients that the Stuttgarters never would have accepted. As one case in point, the De Dion rear end assembly on the later Mercs was a most elaborate piece of bridgework, involving very expensive machining operations, whereas AU's equivalent (borrowed, interestingly enough, from their production Horch), was just a bit of judiciously bent tube. It worked, though. Organizationally, too, Auto Union made the Reichmark stretch. They seldom took a special training car to the circuits and their workshop truck was furnished with just a bench, a portable drill and hand tools. Mercs' mobile workshops made this equipment look laughably frugal. Even the decision to dispense with Porsche's services at the end of '37 was dictated by parsimony.

Particularly during the later stages of the 750 kg. formula, which limited car weight, excluding fuel, oil, water and tires, to 1650 pounds, this financial stringency aggravated Auto Union's problem in staying within the formula's bounds. Combining high strength factors with low weight is, at the extreme, a headache anyway, but much more so when the cost bogy looms large, too. There were times when, at the weigh-in during training sessions, Auto Union had to go to the length of scissoring bits off the cockpit upholstery to beat the scales. Many chassis components, drilled and otherwise banted for lightness, looked as fragile as a meringue, but they nonetheless almost always held up. Thickness of the body panels for the grand prix cars was only 0.3 mm, and a plus error here of as little as a thousandth of an inch added a pound to the car.

Eberan was a glutton for devising special test rigs, his philosophy being that in the long run, although perhaps initially

expensive, such rigs could avert far costlier crackups on the circuit. Among the assemblies and components he and his aides tested this way on the factory floor were brakes, ignition, valve gear, oil pumps, fuel pumps, blowers, and carburetors; in the latter case the apparatus reproduced linear and lateral surge, corresponding to effects created by braking, acceleration and cornering. Finally, they had a master test rig on which the complete cars were driven for an hour under simulated race conditions, the road wheels running on rollers. No degree of realism was neglected during this routine, which included hundreds of gearshifts and brake applications. Even Mercedes, I believe, had nothing quite like it.

A favorite quotation of Prof. Eberan's is Diesel's dictum that invention is 1% genius and 99% drudgery. He pooh-poohs the popular theory that it was primarily inventiveness or technical brilliance that put Germany ahead of France and Italy in the second Heroic Age of grand prix racing. The French and the Italians, he asserts, were at least abreast of Mercedes and Auto Union in these attributes—all they lacked was the sheer damn obstinacy and perseverence of the Teuton. Too, far from claiming for himself any preponderant share of the credit for his department's research and development work, he wants it understood it was *cent* percent a team effort.

The highest output attributed to the biggest and most powerful Auto Union engine, the 6.33 litre R-type, was 545 bhp. The 5.66 litre M125 Mercedes powerplant was credited with exactly one hundred horsepower more. Yet, if Rosemeyer had lived to end that fateful homing run over the kilometer and mile in January of 1938, the Zwickau product would almost certainly have beaten the Mercedes records. Considering there was, according to expert authority, little to choose between the aerodynamic drag of the two designs, this poses an apparent mystery.

The solution likely lies in a difference between the Stuttgart and Zwickau interpretations of the word horsepower. The only brake reading that meant a thing to Porsche, Jakob, Eberan and Co. was one an engine would hold on full bore for at least five minutes. By the same rigorous yardstick, maybe some of Merc's power prodigies would look a shade less prodigious. It isn't suggested anybody was trying to fool anybody. It's just that different people sometimes use the same word for slightly different things.

*—Dennis May*

# ACECA

(Continued from page 20)

off in a hurry. The car squirmed—unpleasantly, to me—from side to side so I came to a stop and asked Jackson-Moore to clue me in on this phenomenon.

"Oh, that" he said, "I'm completely used to it. It never gets any worse than what you just felt. You learn to roll with it; give the steering its head and keep your corrections light and small. You know," he added, "I think it's to do with the tires."

I wasn't completely sold on this explanation, so I asked Bob Oker if he'd noticed it. "Sure," he said, "It's due to the tires, all right. We've tried several makes on my car, and for its particular suspension I think Englebert P-types are the best.

In cornering, the Aceca has no peculiar vices and, aided by fully independent rear suspension, is very quick and tenacious. It is just about impossible to lift a rear wheel while wheel hop on bumpy curves is nearly non-existent. Under power the steering is faily neutral and, although it's tail-heavy, the rear end does not tend to slide out. But if you are overdoing it a bit and back off on the throttle, you bring the tail around. Open the throttle and the tail will stick again. It's a safe car for the go-fast novice and an instrument worthy of expert skills.

This car's brakes are Girling two leading-shoe units with Alfin drums and the word "adequate" fails to do them justice . . . for touring use. As we found with the Ace roadster, they actually get better with continuous use. However, Oker points out that the only real trouble he ever had while racing his Ace came from the front brakes. Under the pressure of the two leading shoes the drums would bell-mouth and begin to crack after three or four hard races. This experience was commonplace and led to AC making Girling disc brakes optionally available for the front ends of cars that are to be raced. The Alfin rear brakes, with a single leading shoe, do less work, run cooler and give no trouble.

AC cars, although they are lighter than lower-priced production sports cars, use double-laced wire wheels and this emphasis on the strength that underlies its punishment-defying reliability seems to be consistent throughout the machine. A beautiful steel-tube space frame provides support for the entire coupe body which has a genuine carved-from-the-solid feel that is not always found in coachbuilt bodies of this type.

The buyer of an Aceca will rarely see the double of his car on the road or parking lot. In a normal month AC produces between 35 and 42 units. Most of these are Aces, i.e., roadsters. The coupes have much more complex frames and body panels—all done by hand. It takes about three months to complete a coupe and average production is two per week.

AC has been slow in building up a sales organization in the U.S., partly because the demand for its small output is very good on the British home market. Still,

## *ACECA*

AC has desired a small number of select outlets in this country and, in the last year or so, has achieved that goal. Jay Chamberlain, of Lotus fame, handles AC in southern California, Arizona, Nevada and Utah. In Washington it's Tom Carstens' Imported Cars of Tacoma. Competition Motors in San Carlos looks after northern California. In Honolulu it's Import Motors; in Dallas, Hulsey and Proctor; in Albuquerque, Motorsport Corp. Pensacola is looked after by Jarrard Motors, Miami by Coronet Motors and Tampa by Dick Sheppard. The rest of the east coast is serviced by AC Imports whose headquarters are at Valley Stream, Long Island.

Says Jackson-Moore, "Our customers aren't stuck on availability of parts or on price. Our parts prices often are lower than those of many of the cheaper cars because our distributors buy directly from the factory. The customer pays only one mark-up. For example, the bumper guards for one low-priced sports car retail for about $8.50. Our distributors can retail our guards for $3.50 and still make a good profit."

It will be a long time before most AC owners have occasion to take advantage of these benefits; the cars have a reputation for being trouble-free and maintenance-free. What they buy is a tailor-made conveyance that is in a class almost by itself. It has style, beauty and distinction and it combines the comforts of the grand tourer with the competence of the pure competition machine. The docile, B-engine Aceca is quick enough for most. For those who are willing to exchange just a bit of temperament for 120 mph-plus speed and even more urgent acceleration, the electrifying "D" engine can be had at no added cost. AC Cars, Ltd. is an old company and a small company, dedicated to the production of a small volume of superior products. In engineering and coachwork it has risen to the challenge of the times with boldness and imagination. With either Bristol or AC engine its cars belong in the rarified class of the connoisseur.

*Griff Borgeson*

## *TRUE HORSEPOWER*

*(Continued from page 31)*

you know, the power output of an engine is largely a function of the *weight* of fuel-air mixture it can burn in a unit of time. Thus any condition that reduces the *weight of oxygen per cubic foot* of the intake air—like high temperature, low barometric pressure, or moisture in the air—will reduce the output of the engine. Average conditions under the hood of a car at average altitude might be 29.4" Hg. barometer, .4" Hg. water vapor pressure, and 110° F. temperature. This does terrible things to the power rating that's based on "standard" conditions . . . in other words, a drop in effective power averaging between 8 and 9%!

The problem of accessory losses is more complicated. American cars are handicapped by the fact that we have to design fans and generators to do their jobs when

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## TRUE HORSEPOWER

*(Continued from page 57)*

pottering along at 15 or 20 mph in traffic—and these jobs are awfully big to begin with. The mass of power-driven accessories on our late cars not only overloads the generator at low speeds, but the cooling problem in traffic is critical. When we get beefy fans and generators to do the job they eat up excessive power when the engine is winding up in the kickdown gear—maybe 10 or 12 hp. The smaller overseas cars are not so rough on this angle.

Some of the other losses can be estimated on more or less a percentage basis. The average single-muffler exhaust system will cost 8 or 10% of peak hp; the average dual setup only 3 or 4%. The air cleaner will want maybe 2%. Heat on the intake manifold will vary widely in its effect, but probably 3% is average. Power losses due to compromises in the automatic spark advance curve will vary over the rpm range, but should average 2% at the top end. And, of course, don't forget optional accessories like air conditioning compressors and power steering pumps. Recent data suggest an average power loss at 4000 rpm (crankshaft speed) of about 6 hp for a compressor and 2 hp for an oil pump.

So it's easy enough to see why honest horsepower output on the road doesn't generally come anywhere near the advertised rating, even when the engine is dynotested with some of the accessories on. I hesitate to generalize here; but let's say a late U.S. passenger car engine will average 30% less than its advertised rating—and a smaller overseas car maybe 10 or 15% less. In other words, a U.S. engine rated at 250 hp might actually show 175 hp on the road; a small 60 hp British engine (gross rating) might be good for 51-54 honest horses under similar conditions, when it's new.

Yes, "when it's new" means a lot here. No discussion of the subject of engine performance would be complete without mentioning the effect of normal everyday wear and tear. This will kill horsepower as quick as anything else. Normal carbon deposit build-up in the cylinders, for instance, will chop off an average of 5% of your peak hp after 2000 to 3000 miles of driving. (An engine that's used only for racing is not bothered so much, due to the higher cylinder temperatures.) Then we have the valve seats and piston rings gradually losing their seal, maybe sludge deposits sticking the rings, maybe the spark timing slipping a little, certainly the breaker points gradually losing their zip, etc., etc. It's not long before you've lost 10% of your total power.

There's very little we can do about all this. Modern lubricating oils and fuels have helped a lot, but every time you start up your engine you're killing it a little. Cold starts, especially, are rough on it. Raw gas dilutes the oil, lubrication is inadequate, and corrosion is rapid at this time. The more cold starts *per 1000 miles* the shorter the useful life of your car. Incidentally, a careful break-in period on a new engine (easy throttle for a couple-thousand miles, accelerating and decelerating at moderate throttle for 1000 miles

to draw oil past the rings, etc.) can do much to prolong the life of a car. An engine that's flogged from the start may show peak performance at maybe 3000 miles, then fall off steadily . . . while an engine that's babied for 3000 miles may increase performance up to 20,000 or more! Think it over.

Now let's talk specific models and black-and-white horsepower figures. And by "black-and-white" figures I don't mean published factory ratings, whether gross, net, SAE, or DIN. What do these engines actually do on the road?

No simple question, obviously. Your first thought will be the faithful old chassis dynamometer, where we measure the horsepower delivered at the rear wheels. What better place to tell what an engine is doing under practical conditions? Well, forget it. A little thought will point up the losses at the transmission and differential, but also the increased rolling resistance of the rear tires as they whip and flex between two small-diameter rollers will give a low power reading. In other words, the power delivered at the tire treads when they're rolling on a level pavement would be considerably higher. This increased rolling resistance loss is proportionally greater on heavy American cars, but it's definitely a factor even on the smaller sports jobs. So I think we had best disregard chassis dyno figures as indicating true road horsepower (though, of course, these are invaluable for *comparative* purposes for tuning).

In the past five years I have done accelerometer and road tests on a large number of U.S. and European cars of all sizes and powers. (An accelerometer is an instrument that indicates the instantaneous rate of acceleration or deceleration of a body.) With these full-throttle acceleration figures at different speeds—and some slide rule gymnastics—we can calculate the true horsepower curve with what I think is good accuracy. Furthermore, it is well established that the speed of a car at the end of a standing quarter-mile acceleration run (through the gears) is a close function of the *true* weight hp ratio. Okay. So I have plotted out on a graph the terminal speed on the quarter of a representative number of our test cars, and plotted these figures against the true weight/hp ratios for the cars, as determined by our accelerometer tests. Then we draw a curve through the points to average them out . . . and, of course, it's a simple matter then to figure honest horsepower from the curve for cars we didn't have a chance to test, merely by taking terminal speeds and weight figures from road tests in magazines like *SCI*.

Clear as mud? Well, anyway, here are some of the things we learn: in the case of American cars we find that our earlier estimate of 30% difference between advertised and true horsepower is pretty close. For example, a '56 Ford that advertises 202 hp actually shows 135 hp by test; a '57 Buick that advertises 300 hp shows 230; a '57 Chrysler New Yorker that claims 325 hp shows only 240; a '57 Cadillac rating 300 horses is 'way off with only 185 honest ponies. There is little doubt that the late Chevrolet V-8's come closer to their advertised horsepower figures, on a percentage basis, than any recent American cars

*(Continued on page 62)*

# *BLOWERS*

*(Continued from page 41)*

Eighteen psi is at the ragged edge for a single-stage Roots rig, but well within the scope of vane-type machinery. Roger Huntington thoroughly reviewed the practicalities in his series beginning in the August, 1956 SCI. A point that can be emphasized is that compression ratios often must be drastically reduced for best results with supercharging.

Also it's possible to have a blower drive that's *too* rigid, as has proved to be the case with the otherwise promising Gilmer "Timing Belt." If your charger is driven by gear or chain directly from the crankshaft, remember that acceleration loadings, while severe, are often not so hard on drive components as torsional vibration of the crank. Effects can be limited by flexible couplings and proper vibration damping. Don't forget the backfire-releasing "blow-off valve," which should be placed as near the intake valves as possible. It should crack open at one and a half times the boost pressure.

Best suited for blown attacks on Class E are now-outclassed 1½ liter cars like older Oscas, Porsches, Lotus-Climaxes and MG specials. Somehow logical (and recalling the flat-twelve G.P. Cisitalia) would be a Porsche with a Judson VW blower for each bank of two cylinders!

Of course the living example of the potency of this whole concept is the MG EX181 record engine. Using modern supercharging techniques, this rehashed BMC B-Type engine performs on a par with Grand Prix mills of a decade ago. With boost cut to run on gas it should still be good for 220 horses or better. Would power a nice factory race car for BMC, what?

Similar to EX181 (four cylinders, twin cams, big Shorrock vane-type blower) was the Italian SVA project of 1949. Intended for American midget racing and thus running on methanol, this horizontally-placed 820 cc jewel cranked out 155 horses at 8200 revs. Cut back to 750 cc and detuned for gas this would still be a tough customer for your Class G Coventry-Climax.

Factory sponsorship of blown sports cars has certainly gone down the chutes recently, as I mentioned earlier, but the Le Mans rules seem to have inspired a handful of installations. In 1952, one of the just-rebodied Lago-Talbots was blown as was a Peugeot-powered Constantin. The latter rig, with Roots pump and triple-vee-belt drive, appeared again in 1954, and a Constantin blower was recently selected to apply five pounds pressure to M. Gregoire's latest prototype.

Later in '52, Lancia flew a brace of Aurelia coupes to Mexico, where they ran well with about 150 horses from belt-driven Roots superchargers. Le Mans next spring saw a similar setup—not so lucky—on the brand new racing coupes.

Regarded as a possible straw in the wind was Aston-Martin's 1954 Le Mans entry of a standard (six-plug) DB3S with a Wade blower driven by shaft from the timing gears. A modest nine pounds pressure pushed peak horses to about 250, but more importantly puffed up the power curve at medium revs. As in many of these cases, the car was strictly experimental and did not warrant a follow-up.

For the 'Ring race in '52, Mercedes turned out a fascinating Roots-blown conversion of their original 300 SL roadster. Shaft-driven from the cam gears, the supercharger was fed by an unusual triple simplified-carburetor setup. Adjustment troubles with that unit kept Kling from doing better than three-tenths of a second off his best time with the unblown version. It wasn't used in the race, and Daimler-Benz haven't mentioned blowers since.

Most impressive postwar blown sports car was without a doubt the 2.8 liter Pegaso. In standard unblown trim, that four-cam V8 was good for from 170 to 190 bhp. Optional was a neatly-engineered installation of a Marshall-Nordec Roots blower which nestled between the intake cams, and dumped the mixture into a simple plenum chamber. Intake was through a big twin-throat Weber, drive was one-to-one, and output was nine psi. Engine power was stepped up to 240 to 250 horses, enough to propel a Touring-bodied Pegaso roadster down the Jabbeke concrete at 151 mph.

Preparing for Le Mans 1953, a futuristic Pegaso with modified "twin-boom" shape was tested at Montlhèry, but perished in a factory fire before race day. This was a particular shame because it was the only genuine sports car that ever boasted *two-stage* supercharging. Sadly, technical details are not available, and nowadays Pegaso are substituting added cubic inches for the finesse of pressure induction.

Very similar to the blown Pegaso in general layout (but having a triple-vee-belt blower drive instead of shaft and gears) was Buick's VP-300 experimental V8 of 1951. This combined a surprisingly high 10 to 1 compression ratio with alcohol fuel and 15 pounds boost to give 335 horsepower from 215 inches. The revs were modest by racing standards—5500—and by bringing this and other details up to modern levels the XP-300, on gas, could personify the kind of performance we plotted earlier.

Several private American specials, built for racing, have done a lot more with less hullabaloo for supercharging development. None was more impressive or ingenious than John Edgar's McAfee-built blown MG TC. This featured an Italmeccanica Roots pump spun at nearly double engine speed to deliver 12 psi. A complex intercooling system, involving two heat exchangers, a pump and an ice-packed storage tank, combatted the rise in temperature that's inevitable when air is compressed.

It's probable that this attention to charge cooling was primarily responsible for the monotony with which this TC kicked out 148 horsepower at the rear wheels. Cutting intake temperature lowers the level of the whole engine cycle and, roughly, allows more boost and higher output with the same fuel and compression ratio.

For this reason, some separation of the blower from the intake ports is desirable. There's a lot to be said for the mechanical unity and excellent response (short path from throttle to valves) of an integral layout like that used in the Pegaso, XP-300 and many hot rods, but temperatures are

bound to be high. This is much more critical with gas than with methanol, which itself is an effective coolant.

If an actual intercooler can be used, good. There are many excellent examples in the history of American racing engines. Separation of blower from ports also allows room for decent manifolding to ensure proper distribution—also critical with high boost. The only bugaboo is that such plumbing can be a source of control problems and erratic running if not laid out with care.

As an example, the Milan-modified 4CLT Maseratis had bigger-than-standard intake ducts, and drivers complained of slow throttle response. The Edgar MG minimized this by using two small-diameter connecting pipes to keep charge velocity high. The remarkable Novis also gained more consistent performance by removing their large flat intercoolers, though retaining a length of moderate-diameter ducting. I'll admit that intercooler design is an advanced science, but still suggest that carefully designed and possibly finned manifolding be considered.

Had this been done, I imagine that the performance of a remarkable conversion might have been even more remarkable. I refer to the 91-inch Offy that was Roots-blown and dropped into a Cisitalia coupe by Pesco Products Division of Borg-Warner, back in 1951. With the Pesco supercharger turning at two-thirds more than engine speed, pressure was 15 pounds and output over 160 bhp (originally 94). Engineers in charge felt that 200 bhp was within easy reach. Probably, but a larger blower *not* pumping directly into the intake ports might have made it easier.

In any case the Edgar MG and Offy-Cisitalia are very close to what I'd like to see more of today. The Crosley, with its Bugatti-like head, has always been a natural for blowing, and there have been many fine boosted MG's. A high-light of early Watkins Glen meets was the duel between Fritz Koster's 1500 cc HRG and Rollie Kieth's sleeved, blown 1100 cc TC. I recall blowers hung on a Healey Silverstone, Lea-Francis, and on the perennial Excalibur-Jaguar. Outside racing there are of course many other examples.

From where I stand the strongest appeal of supercharging in racing, aside from the above mentioned class situation, is the attainment of high power/weight ratios and high absolute results with small-sized machinery. Just feature a properly-boosted Porsche RS—a vehicle capable of winning overall on most short American sports courses. This applies in varying degree to many other competition vehicles up to two liters in size.

Also, while the last Grand Prix formula brought us right up to date on the pressurizing of engines with unlimited choice of fuel, we can still learn a lot about going the route with gasoline. Perhaps the stimulus for research can come from sports car racing, or from a far-seeing G.P. formula of the future. After all, turbo-supercharging—the coming thing in American industry—is close kin to the gas turbine.

Variations are infinite. You may choose

*(Continued on page 63)*

## TRUE HORSEPOWER

in the higher price brackets. They appear to average a power drop of between 15 and 20%—or that would be a true output of around 240 hp for a '58 f.i. competition engine rated 290 hp, and maybe 180 hp for a '57 power pack claiming 220 horses. The '57-'58 Pontiacs come pretty close to this showing. Probably the worst U.S. engine from this angle would be the '54-'57 Ford-Mercury (same basic engine); these are generally 35-40% under their rating in actual output. Chrysler products are about average. Buicks and Oldsmobiles are good. Cadillacs are generally 'way down . . . but don't ask me *why* on all this!

Overseas cars are considerably closer to their advertised ratings. Many German cars will check out virtually equal to the DIN power, within a few percent. A 55 hp Porsche America showed *56 hp* by accelerometer; an early Mercedes 300 sedan, rated 115 hp, actually showed 115 hp on the graph. Even models that admittedly rate by gross hp aren't too far off. An Austin-Healey that advertises 90 gross hp shows a full 86 hp on the accelerometer; an MGA rated 68 hp shows 64 hp on test; a Renault Dauphine, advertising 34 hp, figures out to 30 hp honest. Even in the higher horsepower brackets the difference isn't great. An early XK-120 Jag with the 160 hp rating figured to 140-145 hp on test; a later Mk-VII sedan with the 190 hp engine figured to 180 hp on the graph; a 300-SL Mercedes, advertised at 240 hp with f.i., showed 225 hp in calculations.

How about the hairier competition engines? These apparently are tested carefully under conditions closely simulating road performance, because true outputs appear to be comparatively close to claimed figures. A 2.9 Ferrari rated at 240 hp actually showed *230 hp* on a basis of quarter-mile speed. A D-Jaguar engine, claimed good for 260 hp at 6000 rpm on gas, figured to 255 horses on the slip stick! A 1500 OSCA rated 110 hp figures to exactly 110 hp on the graph. An 1100 Coventry-Climax engine on a Lotus test, advertised at 83 hp, figures to an honest 80 hp on the road. Keep in mind, of course, that underhood temperatures tend to be lower on these competition sports cars (or there may be scoops for cool outside air), so there's no real reason why true output should be far off the advertised claim. This may also be true of many smaller overseas sports and passenger cars.

There are obvious examples of certain European sports engines being considerably overrated. The dohc Porsche 1500 engine is the most notable example. One test on a 100-hp (DIN) Carrera showed an honest output of *81 hp* on the accelerometer! Tracing the quarter-mile speed of a 140-hp competition model on the graph gave a true output of *94 hp!* No, it doesn't add up. Another overrated engine appears to be the Fiat V-8 mill in the Siatas; rated at 100-110 hp, the true output appears to be closer to 75 hp. The old Frazer-Nash 2-litre Mille Miglia engine, rated 140 hp, shows barely over 100 horses by accelerometer.

And so it goes. It's a fascinating subject . . . and certainly great fodder for a bull session with the boys, if nothing else!

*Roger Huntington*

## *BLOWERS*

to install separate motors to drive your blowers, and apply full gross horsepower to the road. That was Lou Fageol's brainstorm for his fantastic Twin-Porsche. Or you may tap a breeze from your air cooling system for a mild boost, like the Franklin Airman and Olympic of 1934.

I see blowing in the future as a powerful tool for the independent experimenter and a formidable advantage for the competition-minded manufacturer. I see it also as being most useful in the smaller-displacement categories. But if you're inclined to apply two stages and 25 psi to that sleeved-out 450S Maserati, I have no objections. In fact, I'll go along for the ride!

*—Karl Ludvigsen.*

## *LISTER-JAG*

use the '58 tubes are four inches across and still 14 gauge. Alf Momo felt that 16 gauge was adequate, and Lister agreed; but mild steel to that specification could not be located in time.

Springing all around is by the popular Girling tubular shock plus coil spring system, the concentric units being canted inward roughly 40 degrees at front and rear. Compared to the Bristol cars, the rear coils have been increased in diameter and leaned inward more sharply — both measures to decrease the height of the tail section (increasing coil diameter allowed a reduction in length). Rear springing units are also anchored in a triangulated framework instead of boxed or tubular uprights, as before.

Parallel, equal-length wishbones attached to MGA spindles guide the front wheels. These A-frames are neatly fabricated of tubing, and precisely pivoted on bronze bushings at the frame. There is no torsion anti-roll bar, which keeps the two front wheels fully independent. The steering box, mounted ahead of the suspension, is a Morris Minor rank and pinion gear giving but two turns lock to lock.

In 1957, production-type Girling disc brakes were fitted all around, with 11 inch front discs and 10 inch discs inboard at the rear. For long-distance racing, the quick-change pads were needed, but these Girling units were sewed up tight by Aston-Martin. Suitable negotiations by Briggs himself cleared up this difficulty and the '58 cars will have these items, fitted to twelve inch discs front and rear.

For short races, unsprung weight was held down by attaching the Dunlop alloy disc wheels with bolts but this year, for long distance races at least, three-eared hub caps will be used.

Rear suspension on the Lister is by a now-classic form of the de Dion pattern. Parallel trailing arms locate each hub fore and aft, while a bronze block on the axle tube slides between vertical guides to give the wheels lateral placing relative to the frame. The three inch de Dion tube bends behind the differential and is fabricated of three straight sections, the center one being but half a foot long. Welds joining the sections are buttressed by gussets, as are the ends of the radius rods, the wishbones, and other such highly stressed members.

Half shafts are short and simple, with Hardy Spicer universal joints and splines.

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## *LISTER-JAG*

*(Continued from page 63)*

A Salisbury final drive unit with hypoid gears and a Dana limited-slip differential ("Positraction," etc.) is bolted to the frame. Across its top is a diamond-shaped plate carrying the calipers for the mechanical hand brakes.

For this year the big Lister's tail section has been redesigned to hold a 45.6 U.S. gallon tank of fuel in addition to a six gallon oil tank for the D-type's dry sump system. This has raised the height of the tail to the level of the windshield top, reminiscent of the first prototype of the Porsche Spyder. Cunningham's cars will have split-proof rubberized fuel tanks just as used on his Jaguars. The windshield, though conforming to the FIA rules for height, is a bit of a "cheater" as the tall engine bulge stops just short of the foot of it, enabling its height to be measured from a lower point than one would expect with the fairly tall XK engine. Brian Lister has always been interested in reducing frontal area on his cars; that he has succeeded is indicated by his claim that the '58 L-J has less frontal area than some current English 1100s. This may be so, but it should also be pointed out that "some English 1100s" have much better shapes aerodynamically than the Lister and it's the product of area times drag coefficient that counts.

Throughout the body, the aluminum skin is riveted to a framework of half-inch 20 gauge tubing which adds stiffness to the whole structure. This is especially the case around the engine compartment and in the nose section, which Williams and Pritchard, Ltd. of Edmonton have managed to make even lower than last year's.

A Marston radiator, with an oil cooler in front of it, is canted steeply back to facilitate the escape of the warm air at the bottom of the car. Two ducts next to the radiator intake pipe air to the front brake discs.

As mentioned, two of the Cunningham Listers are fitted with the Jaguar engine and the matching D-type gearbox. For SCCA racing a big 3.8 liter Momo modified plant is being dropped in, probably with Weber gasworks. At Sebring, though, they had three liter editions of the famous six.

Calculations based on experience with the engine, and on a conversion by "Wilkie" Wilkinson of Ecurie Ecosse, showed that ultimate power output would be higher with a destroked 3.5 block than with the extremely oversquare proportions of a bored-out 2.5 engine. Of course the latter would have required brutal coring changes, too.

At first the Momo Corporation was considered for the task of making up the new crank and rods needed, but Sir William Lyons said that Jaguar would take on the job. Momo and Cunningham are busy enough preparing, entering and racing Jaguar-engined cars in the U.S.A.

The potential output of the 3.0 Jag engine will probably be 255 to 260 bhp (at Sebring, they were quoted at 256 bhp at 6000 rpm). If the Listers which Cunningham received had been as light as expected, namely 1620 pounds dry (no oil, water or gas), the cars should have

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# BMC builds a baby- the Sprite

AT LAST it's here, a small sports car based on BMC's production sedans. Though its announcement has been delayed again and again to ensure that all dealers will have them in the showroom, we are able to present the technical details below and can promise a full scale SCI road test in the August issue.

A genuine two-seater, the steel body's hood and fenders are all one piece, hinging just in front of the laminated windshield. Underneath lurks a hopped-up edition of the BMC "A" series engine, carrying two H-1 S.U. carbs and putting out eleven more horses than the milder Minor or Austin A-35 version, despite an identical compression ratio.

Mixed together by that talented omelet maker, Donald Healey, the Sprite is mechanically all BMC. Some components are from the Minor, some from the A-35, and all in all, it looks like a very tasty dish indeed. Line forms to the left.

**AUSTIN-HEALEY SPRITE**

**SPECIFICATIONS**

**POWER UNIT:**
- BMC "A"
- In-line four, water-cooled
- Valve Arrangement
- pushrod operated ohv, in-line
- Bore & Stroke
- 2.47 x 3.00 in (62.9 x 76.2 mm)
- Stroke/Bore Ratio
- 1.21/1
- Displacement
- 57.8 cu in (948 cc)
- Compression Ratio
- 8.3/1
- Carburetion by
- Two S. U. H-1 semi-down-draft
- Max. Power
- 48 bhp @ 5000 rpm
- Max. Torque
- 52 lb-ft @ 3300 rpm

**DRIVE TRAIN:**
- Transmission ratios
- I ..... 3.63
- II ..... 2.37
- III ..... 1.41
- IV ..... 1.00
- Final drive ratio
- 4.22
- Axle torque taken by
- radius arms

**CHASSIS:**
- Frame
- Pressed steel monocoque body-frame structure
- Suspension, front
- Coil springs and wishbones (identical to A-35)
- Suspension, rear — Rigid rear axle
- Quarter-elliptic leaf springs and radius arms
- Shock absorbers
- Lever action hydraulic
- Steering
- Rack and pinion (from Morris Minor)
- Steering wheel turns L to L
- 2½
- Brakes
- Two leading shoe front, single leading shoe rear
- Brake drum
- 7 in diameter x 1¼ in wide
- Tire size
- 5.20 x 13 tubeless
- Fuel capacity
- 7.2 U. S. gallons

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**Sports Cars Illustrated**
**July, 1958**

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## LISTER-JAG

*(Continued from page 64)*

been roughly competitive with the Ferraris and Astons. But they didn't, and they weren't. To everyone's disappointment at the Woodside establishment, the cars tipped the scales at 1920 pounds, putting them back within 50 or 100 pounds of the obsolescent D's. This three hundred pound difference cannot all be blamed on the two gauge heavier frame tubing so it looks from here as if the Listers will not figure strongly, if at all, in International three liter racing. With the well proven 3.8 mill, it will be a different story (as it was in the President's Cup Race), but with the Chervolet V-8, we should see Briggs (and others) pick up where the Corvette SS left off. There's more than a superficial resemblance between these cars, by the way.

In Cunningham's case the engine and transmission unit were supplied directly by Chevrolet, exact duplicates of those used in the SS (SCI, August, '57). Since no further development work has been carried out on the aluminum heads, the original iron parts were fitted to ensure reliability. The V-8 has been in Lister's shop since October of '57, allowing plenty of time for necessary detail chassis changes to be made. The car's engine room is set well back from the front wheels and is uncluttered, so there should be no major snags.

At first glance it's legitimate to question the use of a Lister for long-distance racing, since it was originally designed for English sprint events. This is partly counteracted by basic design changes — the heavy-duty frame, quick-change brakes and knock-off hubs, and larger rubber fuel tanks — and should be fully made up by the detail changes and preparation of Momo in New York.

Cunningham's team plans for this year include the Lister-Jaguars, a Lister-Chevrolet, and the one 3.8 liter injected D-Type. One of the remaining D's will retire to the Cunningham museum in Connecticut, while the last two will be returned to Coventry, with thanks.

Why the Lister chassis for this new experiment? Those who have driven Archie's car say that its most outstanding feature is its road-clutching traction. Full throttle can be applied at any speed in any gear without spinning wheels; excellent usable acceleration results. The same was the case with the Mercedes 300SLR chassis, and for the same reasons: 52 percent of the weight is on the rear wheels when dry, and much more when fully fueled. The Dana differential and low unsprung weight also help out under bumpy and cornering conditions. Torque the Chevy engine has, and the Lister should apply it to the road with spectacular results.

1958 marks the beginning of an experimental association with Lister, the D-Jaguar acting as a control through the whole program. If reliability is high, drivers are as good as Hansgen, and the Chevy engine's potential is fully explored, this should be a successful and technically interesting season for the white and blue cars.

*Karl Ludvigsen and Stephen Wilcer*

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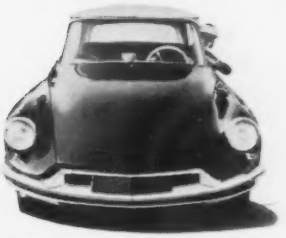

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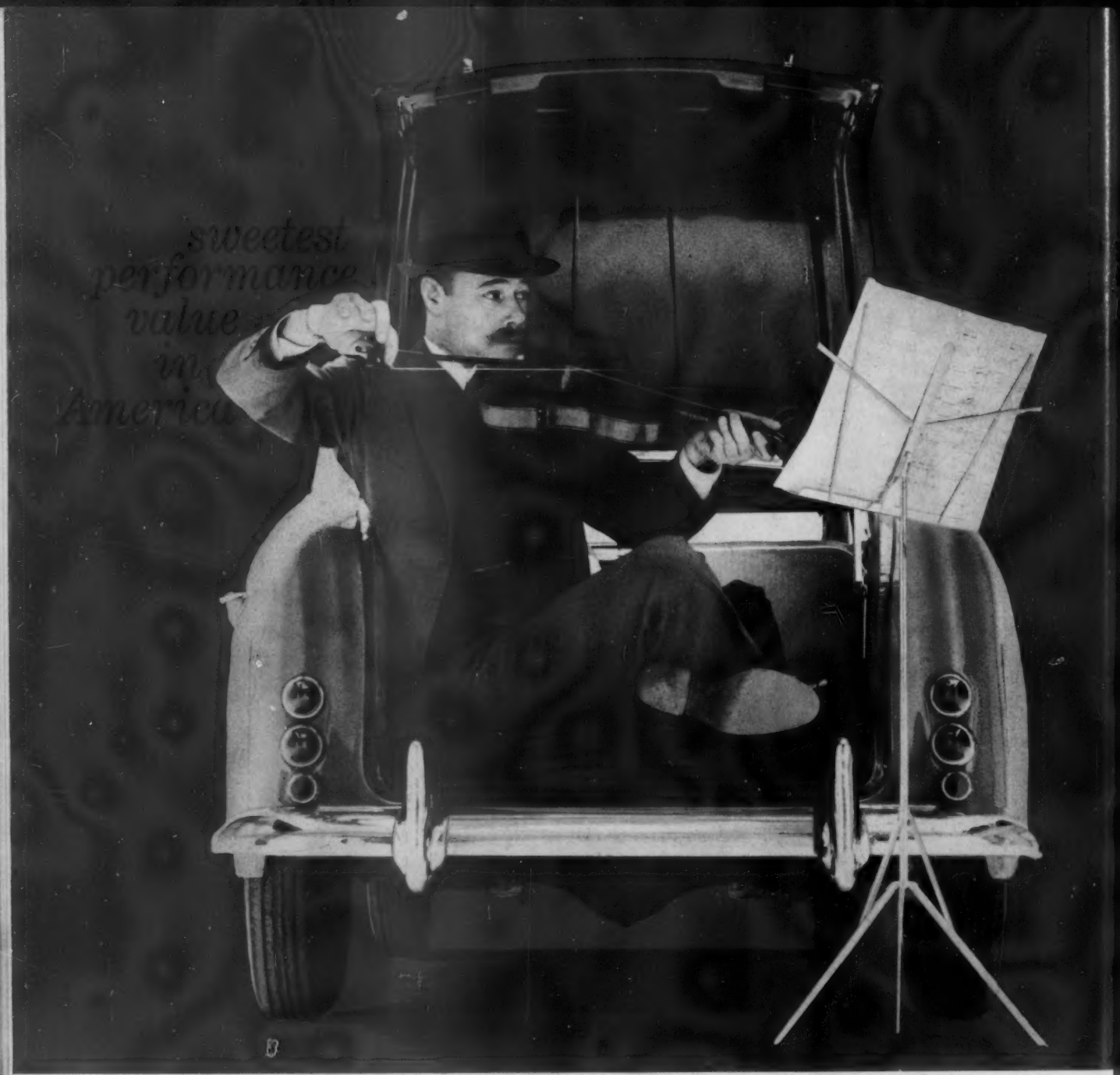


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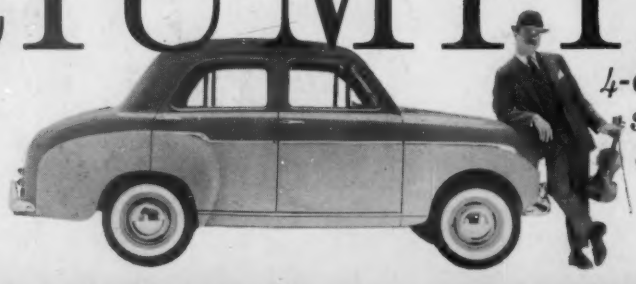

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